



广东建设职业技术学院
GUANGDONG CONSTRUCTION POLYTECHNIC

道路与桥梁工程技术 专业人才培养方案

（中外合作办学方向）

（三年制）

一、 招生考核

1.招收对象：已获得塔克西拉省立技术学院土木技术专业录取资格的学生，并满足附件一：注册文件和证明文件清单所列要求。

2.修业年限：全日制三年。

3.考核：学生完成甲、乙双方制定的课程和学分将得到双方认可，学习的成绩将记录在学生信息库内。学生完成全部课程，经考核符合甲方（广东建设职业技术学院）毕业要求的，将获得甲方颁发的中国政府认可的普通高等学校专科（高职）毕业证书；经考核符合乙方（塔克西拉省立技术学院）毕业要求的，将获得乙方颁发的巴基斯坦政府认可的土木技术专业（Civil Technology）毕业文凭。

二、 教学管理

合作双方组成项目管理委员会负责项目的教学管理，由广东建设职业技术学院院长担任委员会主任。项目课程采用面授或线上教学，中方教师采用英文为主、中文辅助的双语教学，巴方教师采用英语或巴基斯坦语言教学。学校国际学院全面负责中加合作办学项目的运行和管理，市政与交通学院组建道路与桥梁工程技术（中巴合作项目）项目组和语言项目组，负责组织具体教学活动。

1、项目开设的课程由中巴合作学校共同制定，课程的设置应符合中巴教育主管部门颁发专科文凭的要求；

2、项目开设专业基础课程及专业核心课程由中方提供的课程占全部专业课程总数不少于 50%；

3、项目教学由双方共同完成，中方授课学时占全部教学时数不低于 50%；

三、 培养目标及规格

（一） 培养目标

道路与桥梁工程技术专业（中巴合作项目）旨在培养德、智、体、美、劳全面发展，掌握道路与桥梁工程专业知识和基本技能，具备与从事工作岗位相适应的文化素质和专业素养，能较好地运用英语交流和学习、具有一定国际化视野和创新能力，了解中巴文化，能适应国内外建设工程项目施工、管理、咨询服务等需要的复合型技术技能人才。

（二） 培养规格

本专业毕业生应在素质、知识和能力等方面达到以下要求：

1、素质

(1)了解中巴文化，尊重两国主权和领土完整，尊重两国人民各自的政治立场和信仰；

(2)崇尚宪法、遵法守纪、崇德向善、诚实守信、尊重生命、热爱劳动，履行道德准则和行为规范，具有社会责任感和社会参与意识；

(3)具有质量意识、环保意识、安全意识、信息素养、工匠精神和创新思维；

(4)勇于奋斗、乐观向上，具有自我管理能力、职业生涯规划的意识，有较强的集体意识和团队合作精神；

(5)具有健康的体魄、心理和健全的人格，掌握基本运动知识和一两项目运动技能，养成良好的健身与卫生习惯，良好的行为习惯。

2、知识

(1) 掌握必备的语言能力、科学文化基础知识和行业专业知识；

(2) 熟悉与本专业相关的法律法规、技术规范以及环境保护、安全消防、文明生产等相关知识；

(3) 掌握民用工程绘图、道路工程材料应用与检测、建设工程构

造、建设工程结构的基本理论与知识；

- (4) 掌握建设工程民用工程测量、路桥施工技术、路桥施工组织与管理、公路工程施工安全技术、公路工程计量与计价的知识；
- (5) 掌握建设工程信息化技术和计算机操作方面的知识；
- (6) 了解路桥专业主要工种的工艺与操作知识；
- (7) 熟悉建设工程新技术、新材料、新工艺、新设备方面的基本知识；
- (8) 熟悉与本岗位相关的标准和管理规定；
- (9) 熟悉环境与职业健康安全管理的基本知识。

3、能力

- (1)具有探究学习、终身学习、分析问题和解决问题的能力；
- (2)具有良好的语言、文字表达能力和沟通能力；
- (3)能熟练识读路桥专业施工图，准确领会图纸的技术信息，能绘制土建工程竣工图和施工洽商图纸，能识读设备专业的主要施工图；
- (4)能对常用工程材料进行选择、进场验收、保管与应用，能进行建设工程材料的常规检测；
- (5)能应用测量仪器熟练的进行施工测量与建设工程变形观测；
- (6)能编制建设工程常规分部分项工程施工方案并进行施工交底，能参与编制常见单位工程施工组织设计；
- (7)能按照建设工程进度、质量、安全、造价、环保和职业健康的要求科学组织施工和有效指导施工作业，并处理施工中的一般技术问题；
- (8)能对建设工程进行施工质量和施工安全检查与监控；
- (9)能正确实施并处理施工中的建设工程构造问题；
- (10)能对施工中的结构问题做出基本判断和定性分析，能处理一般

的结构构造问题；

(11)能根据建设工程实际收集、整理、编制、保管和移交工程技术资料；

(12)能编制建设工程量清单报价，能参与施工成本控制及竣工结算，能参与工程招投标；

(13)能应用 BIM 等信息化技术、计算机及相关软件完成岗位工作；

(14)能进行 1~2 个土建主要工种的基本操作。

4、就业岗位工作任务及职业能力分析

就业岗位	工作任务	职业能力
施工员	(1) 参与施工组织管理策划。 (2) 参与制定管理制度。 (3) 参与图纸会审、技术核定。 (4) 负责施工作业班组的技术交底。 (5) 负责组织测量放线、参与技术复核。 (6) 参与制定并调整施工进度计划、施工资源需求计划，编制施工作业计划。 (7) 参与做好施工现场组织协调工作，合理调配生产资源；落实施工作业计划。 (8) 参与现场经济技术签证、成本控制及成本核算。 (9) 负责施工平面布置的动态管理。 (10) 参与质量、环境与职业健康安全的预控。 (11) 负责施工作业的质量、环境与职业健康安全过程控制，参与隐蔽、分项、分部和单位工程的质量验收。 (12) 参与质量、环境与职业健康安全问题的调查，提出整改措施并监督落实。 (13) 负责编写施工日志、施工记录等相关施工资料。 (14) 负责汇总、整理和移交施工资料。	(1) 具备必要的表达、计算、计算机应用能力。 (2) 具有施工组织策划能力 (3) 具有施工技术管理能力； (4) 具有施工进度成本控制能力 (5) 具有质量安全环境管理能力 (6) 具有施工信息资料管理能力； (7) 具有社会责任感和良好的职业操守，诚实守信，严谨务实，吃苦耐劳，爱岗敬业，团结协作； (8) 遵守相关法律法规、标准和管理规定； (9) 树立安全至上、质量第一的理念，坚持安全生产、文明施工； (10) 具有节约资源、保护环境意识； (11) 具有终生学习理念，不断学习新知识、新技能。
质量员	(1) 参与进行施工质量策划。 (2) 参与制定质量管理制度。 (3) 参与材料、设备的采购。 (4) 负责核查进场材料、设备的质量保证资料，监督进场材料的抽样复验。 (5) 负责监督、跟踪施工试验，负责计量器具的符合性审查。 (6) 参与施工图会审和施工方案审查。 (7) 参与制定工序质量控制措施。 (8) 负责工序质量检查和关键工序、特殊工序的旁站检查，参与交接检验、隐蔽验收、技术复核。 (9) 负责检验批和分项工程的质量验收、评定，参与分部工程和单位工程的质量验收、评定。	(1) 具备必要的表达、计算、计算机应用能力。 (2) 具有质量计划准备能力 (3) 具有材料质量控制能力； (4) 具有工序质量控制能力； (5) 具有质量问题处置能力 (6) 具有质量资料管理能力 (7) 具有社会责任感和良好的职业操守，诚实守信，严谨务实，吃苦耐劳，爱岗敬业，团结协作； (8) 遵守相关法律法规、标准和管理规定； (9) 树立安全至上、质量第一的理念，坚持安全生产、文明施工；

	(10) 参与制定质量通病预防和纠正措施。 (11) 负责监督质量缺陷的处理。 (12) 参与质量事故的调查、分析和处理。 (13) 负责质量检查的记录, 编制质量资料。 (14) 负责汇总、整理、移交质量资料。	(10) 具有节约资源、保护环境意识; (11) 具有终生学习理念, 不断学习新知识、新技能。
安全员	(1) 参与制定施工项目安全生产管理计划。 (2) 参与建立安全生产责任制度。 (3) 参与制定施工现场安全事故应急救援预案。 (4) 参与开工前安全条件检查。 (5) 参与施工机械、临时用电、消防设施等的安全检查。 (6) 负责防护用品和劳保用品的符合性审查。 (7) 负责作业人员的安全教育培训和特种作业人员资格审查。 (8) 参与编制危险性较大的分部、分项工程专项施工方案。 (9) 参与施工安全技术交底。 (10) 负责施工作业安全及消防安全的检查和危险源的识别, 对违章作业和安全隐患进行处理。 (11) 参与施工现场环境监督管理。 (12) 参与组织安全事故应急救援演练, 参与组织安全事故救援。 (13) 参与安全事故的调查、分析。 (14) 负责安全生产的记录、安全资料的编制。 (15) 负责汇总、整理、移交安全资料。	(1) 具备必要的表达、计算、计算机应用能力。 (2) 具有项目安全策划能力 (3) 具有资源环境安全检查能力; (4) 具有作业安全管理能力; (5) 具有安全事故处理能力 (6) 具有安全资料管理能力 (7) 具有社会责任感和良好的职业操守, 诚实守信, 严谨务实, 吃苦耐劳, 爱岗敬业, 团结协作; (8) 遵守相关法律法规、标准和管理规定; (9) 树立安全至上、质量第一的理念, 坚持安全生产、文明施工; (10) 具有节约资源、保护环境意识; (11) 具有终生学习理念, 不断学习新知识、新技能。
资料员	(1) 参与制定施工资料管理计划。 (2) 参与建立施工资料管理规章制度。 (3) 负责建立施工资料台帐, 进行施工资料交底。 (4) 负责施工资料的收集、审查及整理。 (5) 负责施工资料的往来传递、追溯及借阅管理。 (6) 负责提供管理数据、信息资料。 (8) 负责施工资料的立卷、归档。 (9) 负责施工资料的封存和安全保密工作。 (10) 负责施工资料的验收与移交。 (11) 参与建立施工资料管理系统。 (12) 负责施工资料管理系统的运用、服务和管理。	(1) 具备必要的表达、计算、计算机应用能力。 (2) 具有资料计划管理能力 (3) 具有资料收集整理能力; (4) 具有资料使用保管能力; (5) 具有资料归档移交能力 (6) 具有资料信息系统管理能力 (7) 具有社会责任感和良好的职业操守, 诚实守信, 严谨务实, 吃苦耐劳, 爱岗敬业, 团结协作; (8) 遵守相关法律法规、标准和管理规定; (9) 树立安全至上、质量第一的理念, 坚持安全生产、文明施工; (10) 具有节约资源、保护环境意识; (11) 具有终生学习理念, 不断学习新知识、新技能。
材料员	(1) 参与编制材料、设备配置计划。 (2) 参与建立材料、设备管理制度。 (3) 负责收集材料、设备的价格信息, 参与供应单位的评价、选择。 (4) 负责材料、设备的选购, 参与采购合同的管理。 (5) 负责进场材料、设备的验收和抽样复检。 (6) 负责材料、设备进场后的接收、发放、储存管理。 (7) 负责监督、检查材料、设备的合理使用。 (8) 参与回收和处置剩余及不合格材料、设备。	(1) 具备必要的表达、计算、计算机应用能力。 (2) 具有材料管理计划能力 (3) 具有材料采购验收能力; (4) 具有材料使用存储能力; (5) 具有材料统计核算能力 (6) 具有材料资料管理能力 (7) 具有社会责任感和良好的职业操守, 诚实守信, 严谨务实, 吃苦耐劳, 爱岗敬业, 团结协作; (8) 遵守相关法律法规、标准和管理规定;

	(9) 负责建立材料、设备管理台帐。 (10) 负责材料、设备的盘点、统计。 (11) 参与材料、设备的成本核算。 (12) 负责材料、设备资料的编制。 (13) 负责汇总、整理、移交材料和设备资料。	定； (9) 树立安全至上、质量第一的理念，坚持安全生产、文明施工； (10) 具有节约资源、保护环境意识； (11) 具有终生学习理念，不断学习新知识、新技能。
造价员	(1) 编制各工程的材料总计划,包括材料的规格、型号、材质。在材料总计划中,主材应按部位编制,耗材按工程编制。 (2) 负责编制工程的施工图预、结算及工料分析,编审工程分包、劳务层的结算。 (3) 编制每月工程进度预算及材料调差(根据材料员提供市场价格或财务提供实际价格)并及时上报有关部门审批。 (4) 审核分包、劳务层的工程进度预算(技术员认可工程量)。 (5) 协助财务进行成本核算。 (6) 根据现场设计变更和签证及时调整预算。 (7) 在工程投标阶段,及时、准确做出预算,提供报价依据。 (8) 掌握准确的市场价格和预算价格,及时调整预、结算。 (9) 对各劳务层的工作内容及时提供价格,作为决策的依据。 (10) 参与投标文件、标书编制和合同评审,收集各工程项目的造价资料,为投标提供依据。 (11) 熟悉图纸、参加图纸会审,提出问题,对遗留未发现问题负责。 (12) 参与劳务及分承包合同的评审,并提出意见。 (13) 建好单位工程预、结算及进度报表台帐,填报有关报表。	(1) 具备必要的表达、计算、计算机应用能力。 (2) 具有编制材料总计划能力 (3) 具有编制工程造价文件能力; (4) 具有造价信息收集管理能力; (5) 具有造价成本核算能力 (6) 具有造价资料管理能力 (7) 具有社会责任感和良好的职业操守,诚实守信,严谨务实,吃苦耐劳,爱岗敬业,团结协作; (8) 遵守相关法律法规、标准和管理规定; (9) 树立安全至上、质量第一的理念,坚持安全生产、文明施工; (10) 具有节约资源、保护环境意识; (11) 具有终生学习理念,不断学习新知识、新技能。

(三) 毕业要求

修完本培养方案规定的所有课程并通过考核,总学分 70 学分。

四、 课程设置

主要包括公共基础课和专业(技能)课程。

(一) 公共基础课程

包括:伊斯兰&巴基斯坦学习、汉语 I、汉语 II、中国概况、英语、应用数学 I、应用化学、应用物理、计算机应用。

(二) 专业(技能)课程

包括专业基础类和专业核心类课程,各类课程均涵盖有关实践性教

学环节。

1、专业基础类课程

包括：基础民用工程测量、基础民用工程绘图、道路工程材料、房屋建筑工程学、应用数学 II、公共卫生技术、结构设计原理、高级建设工程技术、工程力学、工程计量、企业家精神。

2、专业核心类课程

包括：道路工程测量、道路与桥梁工程技术专业汉语、道路工程制图，识图和 AutoCAD、道路勘测设计、土力学与基础工程、路基路面工程、桥涵施工技术、公路施工组织设计、公路工程计量与计价、公路与桥梁检测技术、公路养护与管理、BIM 技术应用。

五、 由广东建设职业技术学院授课的课程教学内容与要求

序号	课程名称	主要课程目标	内容与要求
公共基础课			
1	汉语 I	1 知识目标：学生掌握拼音、汉字、词语和语法等基本汉语知识，了解中国历史、地理等基本常识。 2 能力目标：学习者能够理解和使用一些基础词语和句子，完成最基本的交际，初步学会用汉语表达个人情感和态度，完成感谢、道歉、介绍、告别等交际功能。 3 素质目标： 培养学生了解中国文化知识，培养其了解认知中国的兴趣，促进来华留学生知华友好，做中国文化的积极传播者。	本课程是公共基础课，是来华留学生汉语学习的入门课程。课程主要面向零基础学习者，通过本课程的学习，学习者可以打下坚实的语言基础，初步了解汉语的语言结构，包括拼音、汉字、词语、语法等知识。学完本课程，学习者能够理解和使用一些基础词语和句子，完成最基本的交际，诸如问好、询问、介绍、购物等。
2	汉语 II	1. 知识目标：学生掌握字、词、短语、句子，语段、语篇等基本汉语知识，加深对中国历史、地理的了	本课程是公共基础课，是来华留学生汉语学习的中级课程。通过本课程的学习，学习者可以获得听、说、读、写、译各项技能的学习与训练。同时，在这一过程中也

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		解。 2 能力目标：通过本课程的学习，学习者可以获得听、说、读、写、译各项技能的学习与训练。 3 素质目标：培养学生了解中国文化知识，培养其了解认知中国的兴趣，促进来华留学生知华友好，做中国文化的积极传播者。	能够了解中国社会历史文化，不断提高跨文化交际能力。
3	中国概况	1 知识目标：通过本课程的系统教学，让学生从地理、历史、哲学、宗教、文化艺术等方面全面了解中国。 2 能力目标：通过本课程的学习，学生能够面向本国入或者其他国家的来华留学生讲述中国文化故事。 3 素质目标：培养学生深入了解中国、研究中国的学习兴趣及知华、友华、爱华的情感。	通过本课程学习使留学生能够对中国人文与社会发展有基本认识，帮助其更好的适应在中国的学习生活，培养学生深入了解中国、研究中国的学习兴趣及知华、友华、爱华的情感。
专业基础课			
1	道路工程材料	以学生为中心，通过任务引领组织教学，使学生掌握道路、桥涵、隧道等工程建设常用材料技术性能及要求，具备常用材料的试验能力。即掌握水泥、集料、水泥混凝土、钢筋、钢绞线、石料、建筑砂浆、石灰、土、稳定土、沥青及沥青混合料的基本知识和技术要求，掌握普通水泥混凝土和沥青混合料等配合比设计，能独立或合作完成常用材料的试验操作，并能够依照现行标准、规范或规程对试验结果进行正确评价，能够独立完成试验报告。 课程教学过程中坚持教书育人原则，同时培养学生诚实、守信、善于沟通和合作的品质、吃苦耐劳和客观科学的职业精神，为发展职业能力奠定良好的基础。	1、 水泥混凝土材料 掌握矿质混合料组成设计；掌握普通混凝土的配合比设计。 2、 钢筋混凝土用钢材 掌握钢材的生产、结构、构造和技术性能及试验检测方法；了解钢材的技术标准。 3、 砌筑石料 熟悉岩石的技术性技术要求及岩石在工程中的应用。 4、 建筑砂浆 掌握砂浆的组成材料和技术性能。 5、 路基填筑用土 掌握土的概念、土的三相组成、物理性质指标；掌握粘性土的稠度与稠度指标、击实性与击实规律。 6、 土工合成材料 掌握土工合成材料的概念、分类、物理性质指标、力学性质指标及水力学性质指标等知识；熟悉土工合成材料的工程应用。 7、 半刚性基层材料 掌握无机结合料稳定材料的基本概念、组成及组成材料要求和技术性质。 8、 柔性基层材料 掌握柔性基层材料的基本概念和技术性质。 9、 沥青路面材料

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			掌握石油沥青的基本技术性质、技术标准和试验检测方法；掌握沥青路面用集料的质量要求和试验检测方法；了解沥青混合料的特点、分类和使用性能；掌握沥青混合料的组成构造、技术性质、组成材料 and 设计方法。 10、水泥路面材料 掌握水泥路面原材料的技术要求。
2	房屋建筑学	了解民用建筑工业建筑一般建筑构造知识；了解相关的建筑标准和规范。	平面力系的平衡条件及应用；稳定性的计算；静定结构的内力和位移计算，静定结构的内力分析及位移计算。结构构件的内力应力分析及强度、刚度的计算。用力法、位移法和力矩分配法进行简单超静定结构的内力分析及位移计算。 结构计算的基本原则，概率极限状态设计方法简介，混凝土结构材料的力学性能，钢筋混凝土基本构件的承载力计算，钢筋混凝土构件变形与裂缝计算，预应力构件，钢筋混凝土楼盖、楼梯与挑檐，钢筋混凝土单层厂房（排架），钢筋混凝土多层房屋结构简介，钢筋混凝土结构施工图识读。砌体材料及其力学性能，结构抗震设计原则。 要求： 1、掌握正投影的基本理论和作图方法，能够熟练应用绘图仪器绘制图纸的能力； 2、掌握建筑工程图的种类、特点及绘制和阅读的方法。能够会绘制立体的三面投影图、轴测图、剖面图及断面图； 3、能够熟练运用制图标准规范绘制图纸 4、能够掌握房屋各组成部分的构造原理和常用构造方法，并能够看懂建筑详图、节点图的能力； 5、能叙述建筑施工图、结构施工图、的识读和绘制方法
3	结构设计原理	（一）知识目标 1.掌握钢筋混凝土结构的基本概念，受弯构件、受压构件的构造要求及设计计算原理； 2.理解钢筋混凝土各种基本构件的受力性能、破坏特征及《桥规》中的有关规定； 3.理解预应力混凝土受弯构件的应力计算要求及方法， 4.理解结构设计计算中有关作用及作用效应的规定、材料强度的取值标准等。 5.理解圬工结构的材料与特点，圬工结构的材料。掌握圬工砌体的种类及主要力学性能，圬工结构的设计计算原则及圬工受压构件正截面承载力计算。	内容： 1.掌握桥梁工程用钢筋的品种、级别、性能及其选用原则，混凝土在各种受力状态下的强度与变形性能及其选用原则。结构极限状态的基本概念及设计计算原则。理解钢筋与混凝土的共同工作原理，结构可靠度理论的基本原理。 2.掌握钢筋混凝土各种结构构件的基本构造要求，掌握钢筋混凝土受弯构件单筋矩形截面正截面承载力计算、双筋矩形截面正截面承载力计算、单筋T形截面正截面承载力计算、斜截面承载力计算，掌握钢筋混凝土轴心受压构件和偏心受压构件的计算，掌握钢筋混凝土受拉构件的承载力计算，理解钢筋混凝土受扭构件的计算要点，掌握钢筋混凝土构件的挠度计算和裂缝宽度计算方式。 3.了解预应力混凝土受弯构件的应力计算要求及方法，端部锚固区的应力计算要求和方法。掌握预加应力混凝土的原理及预应力混凝土受弯构件正截面和斜截面抗裂计算要求和方法，变形计算，同时要掌握预应力混凝土简支梁设计计算方法步骤。

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		(二) 能力目标 1.工程思维的能力 2.理解规范的能力 3.利用力学知识分析桥梁基本构件受力的能力 4.加工制作基本构件的能力 5.常用构件的基本设计计算能力 (三) 素质目标 1.具有较好的学习新知识和技能的能力; 2.具有解决问题的方法和制定工作计划的能力; 3.具有综合运用知识与技术从事程度较复杂的技术工作的能力; 4.具有自学能力、理解能力与表达能力; 5.具有良好的职业道德和敬业精神; 6.具有团队意识及妥善处理人际关系的能力; 7.具有沟通与交流能力; 8.具有计划组织能力和团队协作能力。	4.了解圬工结构的概念与特点，圬工结构的材料。掌握圬工砌体的种类及主要力学性能，圬工结构的设计计算原则及圬工受压构件正截面承载力计算。 5.运用工程软件进行桥梁结构分析及计算。 要求： 能够进行荷载计算和极限状态设计； 能够进行钢筋混凝土构件计算； 能够进行预应力混凝土梁板构件计算； 能够进行圬工结构设计计算； 能用工程软件进行结构分析计算。
专业核心课			
1	道路工程测量	培养学生具备较强的动手操作能力思维能力；掌握常用的工程测量仪器的使用方法和测量规程，能根据实际工程问题设计测设方法；具有分析和解决工程实践问题的能力。	1、水准测量 2、角度测量 3、距离测量与直线定向 4、光电测距与全站仪 5、地形图的测绘与应用 6、道路中线测量 7、路线纵、横断面测量 8、道路、桥梁施工测量 要求：掌握工程测量的基本理论、基本知识和测量方法，掌握测量仪器的使用，并通过测量基本技能的训练，具有测绘和使用地形图、承担路桥建设工程施工测量工作的能力。
2	道路与桥梁工程技术专业汉语	学生将能够: 1. 掌握未来在中国工作时所需要的专业汉语知识和技能 2. 在中国道路与桥梁工程领域使用汉语进行听、	1.掌握《建筑法》、《建设工程质量管理条例》中有关建设工程质量管理的专业词汇； 2.掌握《安全生产法》、《建筑工程安全生产管理条例》中有关建设工程安全管理的专业词汇；

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		说、读、写、译 3. 自主学习道路与桥梁工程专业的中文书籍	3.熟悉《公路法》中的专业词汇； 4.掌握《JTG 1001-2017 公路工程标准体系》中的专业词汇 5.掌握《JTG B01-2014 公路工程技术标准》中的专业词汇 6.掌握《JTG D20-2017 公路路线设计规范》中的专业词汇 7.掌握《JTG D30-2015 公路路基设计规范》中的专业词汇 8.掌握《JTG D40-2011 公路水泥混凝土路面设计规范》中的专业词汇 9.掌握《JTG D50-2017 公路沥青路面设计规范》中的专业词汇 10.掌握《JTG D60-2015 公路桥涵设计通用规范》中的专业词汇 11.掌握《JTG/T D70-2010 公路隧道设计细则》中的专业词汇 12.掌握《JTG/T 3610-2019 公路路基施工技术规范》中的专业词汇 13.掌握《JTG/T F20-2015 公路路面基层施工技术细则》中的专业词汇 14.掌握《JTG/T F30-2014 公路水泥混凝土路面施工技术细则》中的专业词汇 15.掌握《JTG F40-2004 公路沥青路面施工技术规范》中的专业词汇 16.掌握《JTG F90-2015 公路工程施工安全技术规范》中的专业词汇
3	道路工程制图，识图和 AutoCAD	（一）知识目标 1. 学会使用软件各常用命令的操作； 2. 学会工程平面图、纵断面图、横断面图及结构详图的绘制方法与步骤； 3. 学会各类工程图纸的布图方式； 4. 能够准确的绘制道路工程施工图； （二）能力目标 1. 培养学生具备较强的软件操作能力；能把工程实体与图上内容结合起来，并能准确绘制。 2. 能够掌握 AutoCAD 软件的安装和启动方法，并熟悉软件的工作界面。 3. 掌握 AutoCAD 软件的常用绘图和修改命令。 4. 掌握 AutoCAD 软件的环境设置。掌握 AutoCAD 软件的文字和尺寸标准样式设置。	（一）制图基础 了解 CAD2008 软件基本操作界面，学会基本操作的相关要求。 （二）基本平面图形绘制 能够进行图层设置，学会基本绘图编辑命令修改图，掌握相应的快捷绘图命令。 （三）文字输入 掌握文字样式编辑和修改，会输入文字，会制作表格。 （四）尺寸标注 重点掌握尺寸标注样式编辑和修改，能够进行尺寸标注。 （五）图块 了解图块的特点，学会创建、插入图块，能够修改、编辑图块。 （六）建筑图及道路平面图绘制 掌握建筑平面图、道路平面图的绘制方法和步骤。 （七）道路横、纵断面图及结构详图的绘制 掌握针对各种不同图形的绘制要求。 （八）图形输出 掌握图形布局设置与打印输出。 （九）熟练软件的安装和启动方法，软件的工作

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			界面，软件的基本绘图和修改命令，尺寸标准样式的设置，文字样式的设置及输入，图层的设置，块的设置、多线的设置。 能够打开绘图软件，新建文件和保存文件，调用工具栏，选择图元等。能够利用基本绘图和修改命令绘制工程图例和构件。 能够正确地对不同图形进行尺寸标注 能够按照不同要求输入文字。 能够正确地绘制工程施工图。
4	道路勘测设计	使学生具有道路线形设计的基础理论知识，熟悉道路勘测设计程序、内业、外业工作内容和方法，以及公路工程基本建设项目设计文件的编制。	主要内容：道路平面、纵断面、横断面的设计原理和方法，不同勘测阶段的道路野外各作业组的工作内容、要求和方法，勘测设计程序，道路选线、纸上定线、道路改建、道路交叉的原则和方法。 教学要求：使学生具有道路线形设计的基础理论知识，熟悉道路勘测设计程序、内业、外业工作内容和方法，以及公路工程基本建设项目设计文件的编制。
5	土力学与基础工程	使学生具有地基土的基本物理性质及土力学的基本知识；了解地基处理各种方法；能进行桥梁浅基础设计；学会基本土工试验的操作技能。	1、土的物理性质及土的工程分类 2、土中应力 3、土的抗剪强度与地基承载力 4、软弱地基的处理 5、天然地基上浅基础 6、桩基础 要求：认识土的三相组成及工程性质，了解土的工程分类和各基础的初步设计，以及地基基础的处理方法；掌握土力学的基本理论，基础施工的工序步骤。
6	路基路面工程	通过理论教学和课内实训、课程作业、查阅资料等辅助教学环节，使学生掌握路基路面工程材料特性、掌握车路环境等影响因素，掌握路基支挡防护加固、沥青路面、水泥混凝土路面、路基路面排水等方面设计理论与方法，了解路基路面工程相关方面的施工工艺特点、方法，熟悉路基路面结构层材料的试验及检测方法，同时对路面养护与管理等也要有所了解。	主要内容：路基强度及稳定性的概念，路基排水设计的原则和基本知识，路基设计原理和方法，路基的防护与加固，路面基层与垫层材料组成设计，柔性路面和水泥混凝土路面设计的基本原理与方法。 教学要求：主要培养学生掌握路基读懂公路工程设计图纸的能力。
7	桥涵施工技术	1、能看懂简单的桥涵施工图 2、能认识并使用简单、常用的桥涵施工机械设备 3、能了解中、小桥涵施各细部尺寸的名称 4、能根据公路桥涵施工技术规范 JTG/T F50-2011，并根据公路工程质量检验评定标准（土建工程）JTG F80/1-2017，公路工程质量检验评定标准（机电工程）JTG 182-2020 对工程项目质量	主要内容：常用桥涵构造的基本知识，桥梁基础、墩台、钢筋混凝土桥、预应力混凝土桥、拱桥和涵洞的常规施工方法、施工工艺和施工技术，悬臂施工法、转体施工法和顶推施工法基本知识。 教学要求：主要培养学生掌握桥涵的构造和设计原理，能运用设计规范、手册和标准图进行桥涵的设计并计算工程数量，并能清晰读懂桥涵设计图纸，具备桥梁施工的基本能力。

序号	课程名称	主要课程目标	内容与要求
		进行检验和评定 5、能了解桥涵常见的病害及处理方法	
8	公路施工组织设计	使学生能够掌握公路施工组织的基本理论和方法,并通过案例,完整地展示《实施性施工组织设计》的编制内容和方法,为有关的后续课程打下必要的基础,有效培养学生逻辑思维能力,促进学生综合素质的全面提高。	主要内容: 1. 公路施工组织概论 2. 施工过程组织原理 3. 公路工程施工组织设计 4. 机械化施工组织设计 5. 网络计划技术 教学要求: 主要培养学生了解公路基本建设过程中,各阶段施工组织设计相关文件;掌握施工过程组织原理、网络计划技术,掌握公路工程施工组织设计、机械化施工组织设计的实际使用方法与技巧;熟练应用施工方案、施工方法的优化比较及时间组织、空间组织、资源组织方法。
9	公路工程计量与计价	1 知识目标 (1) 明确“公路工程工程量清单计价模式”的基本原理。 (2) 了解公路工程产品价格的构成,熟悉并掌握公路工程产品价格计算的基本知识和理论。 (3) 掌握工程量清单编制和工程量清单计价的基本方法。 (4) 掌握现行的工程量计算规则,分项工程量的计算顺序和计算方法; (5) 熟悉公路工程各分部分项工程预算定额包括的内容; (6) 明确各分部分项工程的特点,掌握工程量计算技巧; (7) 能够根据有关规定计算公路工程的工程造价。 2 能力目标 (1) 具备独立完成一般施工图预算的编制能力。 (2) 具备手工和软件编制定额计价和工程量清单计价的能力。 (3) 具有分析和解决工程实践问题的能力。 3 素质目标 (1) 树立爱岗敬业的思想,自觉遵守职业道德及行业规范。 (2) 培养学生专业兴趣、工作热情和创新意识。 (3) 培养学生的法律意识、法律观念。 (4) 培养学生具有良好的沟通交流能力、团队合作意识以及健康的身体和心理。	1. 工程量清单 (1) 学习并领会工程量清单的含义 (2) 领悟工程量清单与招投标的关系 (3) 学习工程量清单的作用 (4) 学习工程量清单的编写步骤 要求: 能够看得懂工程量清单的编写案例。 2. 公路工程计量 (1) 描述公路工程计量概念、原则及方法与程序 (2) 领会计量总则 (3) 熟悉公路工程各专业计量细则 要求: 领会计量方法与程序;区分监理及施工方在计量工作中各自的职责。 3. 工程量计算 (1) 学习并领会工程量的含义 (2) 学习路基、路面及桥涵构造物工程量计量原则 (3) 熟知常用工程结构实物工程量计算公式 要求:能够根据施工图纸完成工程量的计量。 4. 计算材料的平均运距 学习并领会材料经济供应范围的确定 要求: 学会计算材料的平均运距。 5. 路基路面清单计量细则及运用 (1) 学习路基工程计量方法 (2) 学习路面工程计量方法 (3) 学习并领会路基清单计量细则 (4) 学习路面清单计量细则及运用 要求: 能够正确运用路基路面清单计量细则完成实际工程中路基路面的计量。 6. 桥梁清单计量细则及运用 学习并领会桥梁钢筋及混凝土工程的清单计量细则 要求: 能够完成桥梁结构物钢筋混凝土工程的计量

序号	课程名称	主要课程目标	内容与要求
			7. 计量与支付 能知道计量支付的种类及支付报表的组成要求： 学习计量支付月报表的编制方法 8. XXX 桥梁计量实例 完成 XXX 桥梁工程全桥工程量的核算与计量要求： 能够根据施工图纸完成全桥主要工程量的核算
10	公路与桥梁检测技术	提供比较完善的公路检测基本理论和技术原理，提供适应性比较强、内容比较先进的检测理论和技术方法。通过学习掌握相关技术规范要求的主要试验及现场检测的具体操作，理解关键的注意事项及要求。	主要内容：公路工程质量检验评定方法；试验检测数据的处理；路基路面几何尺寸及路面厚度检测方法、数据处理及结果的评定；路基路面压实度检测方法、数据处理及结果的评定；路面平整度检测方法、数据处理及结果的评定；路面抗滑性能检测方法、数据处理及结果的评定；路基路面强度指标检测方法、数据处理及结果的评定；钻孔灌注桩完整性检测方法、数据处理及结果的评定；结构混凝土强度检测方法、数据处理及结果的评定。 教学要求： 主要培养学生掌握公路与桥梁检测技术。
11	公路养护与管理	（一）知识目标 1、掌握公路养护有关的基本理论、基本技能和管理方法； 2、具有分析公路病害产生原因的能力； 3、掌握公路养护维修技术以及病害的防治措施； 4、了解公路养护工作的组织与管理内容以及科学的养护管理方法。 （二）能力目标 培养学生具备较强的动手能力思维能力；具有分析和解决工程实践问题的能力。	1、路桥工程路基养护 2、路桥工程路面养护与维修 3、桥梁及涵洞养护与维修 4、隧道养护技术与维修 5、路桥工程突发灾害预防治理 6、路桥工程沿线设施的养护 要求： 1、掌握路桥工程养护有关的基本理论、基本技能和管理方法； 2、具有分析路桥工程病害产生原因的能力； 3、掌握路桥工程养护维修技术以及病害的防治措施； 4、了解路桥工程养护工作的组织与管理内容以及科学的养护管理方法。
12	BIM 技术应用	1、知识目标： (1)了解并掌握BIM技术的基本理论和思维方法，掌握BIM数字信息仿真技术模型，认识BIM技术发展现状及前景，掌握BIM技术在项目建设全生命周期模型中应用的理念和方法。 (2)掌握BIM技术可视化与虚拟施工功能，理解并掌握建设全阶段各部门基于可视化平台协同工作的原理模型 (3)了解BIM在建筑全生命周期的应用，掌握建筑模型的创建方法，和建筑构件族的制作方法，以及各专业间的协同，达到具备解决实际项目中遇到问题的能力。 2、职业技能目标： (1)能使用BIM技术进行简单建筑类型的平、立、剖面设计的基本方法并运用到实际设计中。 (2)会使用BIM技术建筑构件构造设计的方法，主要建筑构件（基础、墙体、楼地层、屋顶、	（一）引入BIM技术概念与应用领域 了解BIM国内外发展情况概述，BIM工程建设全生命周期应用，BIM应用案例； （二）BIM软件工具简介 常用BIM软件介绍 （三）BIM模型整合 各专业BIM模型整合流程、方法； （四）基于BIM的浏览展示方法 模型显示模式的设置；查看模型视图方法：掌握漫游功能、输出漫游动画； （五）基于BIM的数据应用和管理方法 构件属性查询、竣工BIM模型的数据管理、基于BIM的模型检查方法 （六）基于BIM的工程量统计方法： 模型量统计、输出工程量列表 （七）用户应用BIM的目标及条件 用户应用BIM的目标、应具备的条件 （八）用户应用BIM的实施路线； 业主BIM应用的主要任务；实施的流程、模式； （九）BIM成为生产力的关键要素 了解BIM怎样提高生产力；BIM成为生产力的几个关键步骤；BIM人才的培养； （十）BIM工作环境和资源 了解硬件环境、软件环境、模型组织、模型标准、

序号	课程名称	主要课程目标	内容与要求
		楼梯、门窗)的构造设计方案,能进行简单的构造设计,通过房屋建筑学课程设计的进一步训练加强建筑方案设计和建筑构造设计实操技能的培养。	BIM应用资源

六、专任教师任职要求

(一) 专任教师

- 1、具有高校教师资格和本专业领域的有关证书;
- 2、遵守国家宪法和法律,有奉献精神,热爱教师职业,有良好的职业道德;
- 3、具备教学能力,且具有较强信息化教学能力,能够开展课程教学改革和科学研究;
- 4、具备建设工程相应的实践能力,获得建设工程类职业资格证书且具有相关企业技术工作经历,具备“双师”素质;
- 5、语言表达能力强,善于与学生沟通;具备与企业交流、沟通和合作能力;
- 6、原则上每5年累计不少于6个月的企业实践经历。

(二) 兼任教师

- 1、热爱教师职业,具备良好的思想政治素质、职业道德和工匠精神;
- 2、就职于路桥工程企业,具有5年以上工作经历或教学经验;
- 3、具有中级及以上相关专业职称,能承担专业课程教学、实习实训指导和学生职业发展规划指导等教学任务。

七、教学条件

中巴合作办学项目又称 CCTE 现代化中巴双学历职业技术教育联合培养项目, CCTE (Chinese + Commercial Culture + Technical skills +

Employment) 即“汉语+商务文化+专业+就业”的一体化。该项目由：广东建设职业技术学院、塔克西拉省立技术学院、旁遮普省技术教育和职业培训局、巴基斯坦青年基金会、北京唐风汉语教育科技有限公司五方合作完成。

(一) 广东建设职业技术学院

广东建设职业技术学院具备能够满足正常的课程教学、实习实训所需的专业教室、实训室和实训基地。

1、专业教室

配备黑板、多媒体教学设备，互联网接入或 WIFI 环境，并具有网络安全防护措施。安装应急照明装置并保持良好状态，符合紧急疏散要求、标志明显、保持逃生通道畅通无阻。

2、校内实训室

配备必须的实训器材、展台、桌椅、投影设备、白板、计算机等，并安装专业必须的施工仿真、广联达计量计价软件等，网络接入或 WIFI 环境，无线终端。目前本专业的校内实训室如下表所示：

序号	实训室名称	实训项目	设备配置要求	
			主要设备名称	数量
1	土建工种实训室	土建工种实训	钢筋套筒冷挤压机	1
			钢筋直螺纹套丝机	1
			电渣压力焊机	1
2	建设工程材料实验室	建设工程材料实验	振动台	1
			水泥胶砂搅拌机	2
			水泥净浆搅拌机	5
3	测量实训室	测量实训	光学经纬仪	20
4	力学实验室	力学实训	万能材料试验机	1
5	土工实验室	土工实训	三轴仪	1
6	质量检测实训室	质量检测实训	检测仪器一套	15
7	砌筑工实训室	砌筑工实训	砌筑工具一套	15
8	钢筋工实训室	钢筋工实训	钢筋工具一套	15
9	结构综合实训室	结构综合实训	结构模型	20
10	招投标实训室	招投标实训	电脑、资料、招投标实训平台	15

11	工程造价实训室	工程造价实训	电脑、软件、工程造价综合实训平台	60
12	建设工程设备实训室	建设工程设备实训	建设工程设备模型	15
13	建设工程装饰实训室	建设工程装饰实训	建设工程装饰模型	10
14	建设工程工业化公共实训中心	装配式建设工程实训	综合管廊模型、装配式工法楼、铝模快拆体系	3
15	虚拟仿真实训基地	施工组织设计实训	建设工程仿真实训系统软件、路桥施工远程监控设备及软件、路桥施工工艺仿真实训平台	30
16	BIM 实训中心	识图实训	电脑、BIM 三维识图系统、BIM 钢结构节点学习平台	60

3、校外实习实训基地

本专业具有稳定的校外实习基地。能够为学生提供工程施工、工程监理、工程设计、项目招投标、工程预结算、工程检测等相关的实习岗位，能涵盖当前建设工程产业发展的主流技术，可接纳一定数量的学生实习；能够配备相应数量的指导教师对学生实习进行指导和管理；有保证实习生日常工作、学习、生活的规章制度，有安全、保险保障。主要校外实习基地如下表所示：

企业类型	数量	功能	可接纳学生人数
施工企业	100	土木工程施工、管理实训	300
监理企业	50	土木工程监理、咨询实训	150
造价咨询公司	10	工程造价、咨询实训	50
设计企业	5	设计实训	50
技术服务、检测企业	5	技术服务、检测实训	50

4、信息化教学

随着信息化教学的推进，本专业在教学过程中也不断推陈出新，在课堂上，普遍采用职教云 APP，实现师生之间快速、随机互动，提升课堂学习专注度，及时拍照展示学生的学习效果。便于学生线下学习、讨论，提升教学效果。

（二） 塔西拉省立技术学院

塔西拉省立技术学院位于旁遮普省塔西拉市。成立于 2010 年 9 月，

校长 Engr. Muhammad Roshan Awan 先生隶属于旁遮普省职教局，学校占地面积 50000 平方米，教职员工 81 人，开设机械，建设工程技术，电气技术，机电一体化技术，化工技术和电子通信技术等专业，在校生近 2000 名，建设工程技术专业在校生 300 名。

该校是由旁遮普省技术教育&职业培训局(P-TEVTA)确定的首批与中国高职院校开展中巴 CCTE 模式国际合作办学的试点院校。将引进中国先进建设工程技术专业标准与课程资源在该校落地，开设中国院校巴基斯坦分校，中巴联合培养本土技术技能人才，服务于中巴产业合作。

该校所在的塔克西拉（Taxila）位于巴基斯坦首都伊斯兰堡西北约 50 公里处，东南距拉瓦尔品第 35 公里。这是一座有着 2500 年历史的著名古城，其佛教遗迹有 2000 多年的历史，覆盖了 2500 平方公里，是举世闻名的犍陀罗艺术的中心，也是南亚最丰富的考古遗址之一。中国高僧法显、玄奘等都到过这里。塔克西拉的古城遗址是世界文化遗产，曾是佛教中心。

（三） 旁遮普省技术教育&职业培训局(P-TEVTA)

巴基斯坦伊斯兰共和国（The Islamic Republic of Pakistan），简称巴基斯坦，是首个和中华人民共和国建立外交关系的伊斯兰国家。作为中国的坚定朋友，与中国“是长期、全天候和多方面发展的友好关系”。国土面积约 80 万平方公里，总人口 2.08 亿（2017 年人口普查数据），国内生产总值 2782.2 亿美元，人均国内生产总值 1363 美元（2019）。

旁遮普是巴基斯坦人口最多的省份（1.1 亿，占巴全国总人口的 50%以上）。也是巴基斯坦工、农业（产值占全国的 70%）最发达、实力最强的省份。由于自然条件好，中国与巴基斯坦的所有农业合作项目都集中在旁遮普省，是巴基斯坦唯一实现县县通公路的省份。

旁遮普省技术教育&职业培训局(P-TEVTA)主要负责该省职业技术教育学院投资运营工作。该局是巴基斯坦最大的职业技术教育&培训机构，也是巴基斯坦省级职教局中最具前瞻性的。目前有 403 所职业技术教育学院，每年有招收的学生有 25 万人，线上学生有 5 万人，其中有 45,000 多人专修 3 年高职文凭，主要学习土建、机械、电气、电子等其它专业。具体职业技术教育&培训时限从 3 个月到 4 年，其中 3 年是 DAE 高职职业技术教育、4 年是本科类教育。

2021 年 7 月 15 日，唐风携手青年基金会与 P-TEVTA 签署了战略合作协议。将率先引入建设工程技术和软件技术两个专业的中国标准与课程资源，作为全省 403 所职业院校的强制标准推广使用。同时支持中国院校在其下属的优秀职业院校拉合尔 PGA 省立技术学院（试点软件工程专业标准）、塔西拉省立技术学院（试点建设工程技术专业标准）内设立巴基斯坦分校。

（四） 巴基斯坦青年基金会

巴基斯坦青年基金会（Zalmi Foundation），是由成立于 1971 年的巴基斯坦 JW-SEZ 集团下属机构设立的非营利性组织。该集团与世界一流的知名公司合作，成功地在巴基斯坦建立起制造和商业中心，在旁遮普省有 JW-SEZ 专属工业园。其下属的 Peshawar Zalmi 球队是最受关注的巴“国球”——板球球队，深受青年人的喜爱。JW-SEZ 集团服务和参股了很多中国大型企业的在巴项目：例如北汽福田轻卡工厂、上汽 MG 牌新能源汽车工厂、海尔家电工厂、中资玻璃器皿合资工厂等，JW-SEZ 集团与在巴中资企业拥有良好而深度的合作关系。

巴基斯坦青年基金会（Zalmi Foundation）设立的目标和承诺是倡导青年发展、妇女赋权、教育和社会活动。在引进中国先进的职业教育体系、现代化的教育技术和主导学科进入巴基斯坦教育体系，帮助培养巴

基斯坦社会经济发展所需要的高质量本土化职业技能人才等方面与唐风国际教育集团有共同的愿景和使命。该基金会作为巴基斯坦唐风的战略合作伙伴，来共同推动中国职业教育标准与海外分校在巴基斯坦的落地。

（五） 北京唐风汉语教育科技有限公司

北京唐风汉语教育科技有限公司所属的唐风国际教育集团深耕“互联网+”汉语国际教育 15 年，以其信息化平台与课程服务了国内外百所重点高校和职业院校，通过在泰国、马来西亚、俄罗斯、韩国、巴基斯坦、英国、法国等多个国家开设的海外分公司并与所在国教育主管机关开展深度合作，建立了境外落地服务体系服务中外教育合作，构建了“汉语+商务文化+技能+就业”的一体化中外教育合作新模式（CCTE 模式）。目前已服务以北京大学、北京师范大学、美国哥伦比亚大学、英国伦敦大学学院、深圳信息职业技术学院为代表的国内外 500 余所高校、职业院校的国际交流合作。在境外办学领域，唐风联合中国近五十所高校、职业院校在泰国、马来西亚、俄罗斯开办不同学科、专业的境外办学项目，培养学历留学生近千人，高质量的毕业生受到海外中资企业的欢迎。

2020 年，唐风携十五年服务中文教育、国际教育的经验设立巴基斯坦子公司。巴基斯坦唐风引入中国在巴最大的中资供应链企业参股，并在成立伊始即与巴基斯坦联邦教育部及其下属教育管理机构、巴基斯坦青年基金会、巴基斯坦知名高校、在巴中资企业等机构签署全面战略合作协议，引进中国先进的职业教育体系、现代化的教育技术和优势学科进入巴基斯坦教育体系，帮助培养巴基斯坦社会经济发展所需要的高质量本土化职业技能人才，启动中巴现代化 CCTE 双学历联合培养职业技术教育人才计划。

八、 教学计划

(一) 专业基础与专心核心课程教学安排

课程类别	序号	课程代码	课程名称	学分	总课时	教学地点	授课形式	授课机构
专业基础类课程	1	Civil 104	基础民用工程测量	4	256	巴基斯坦	面授	GCT, Taxila
	2	Civil 143	基础民用工程绘图	3	224	巴基斯坦	面授	GCT, Taxila
	3	0801119	道路工程材料	2	128	巴基斯坦	面授	Blended (GCP, online GCT, Taxila)
	4	0801539	房屋建设工程学	1	32	巴基斯坦	面授	Blended (GCP, online GCT, Taxila)
	5	Math 212	应用数学 II	2	64	巴基斯坦	面授	GCT, Taxila
	6	Civil 203	公共卫生技术	3	160	巴基斯坦	面授	GCT, Taxila
	7	0801609	结构设计原理	2	64	巴基斯坦	网络+面授	Blended (GCP, online GCT, Taxila)
	8	Civil 223	高级建设工程技术	3	160	巴基斯坦	面授	GCT, Taxila
	9	Civil 263	工程力学	3	160	巴基斯坦	面授	GCT, Taxila
	10	Civil 232	工程计量	2	128	巴基斯坦	面授	GCT, Taxila
	11	Civil 271	企业家精神	1	32	巴基斯坦	面授	GCT, Taxila
	小计			26	1408			
专业核心类课程	1	0801339	道路工程测量	2	128	巴基斯坦	网络+面授	Blended (GCP, online GCT, Taxila)
	2	0801939	道路与桥梁工程技术专业汉语	1	32	中国	面授	GCP
	3	0801949	道路工程制图, 识图和 AutoCAD	3	160	中国	面授	GCP
	4	0801579	道路勘测设计	2	128	中国	面授	GCP
	5	0801149	土力学与基础工程	2	128	中国	面授	GCP
	6	0801219	路基路面工程	2	128	中国	面授	GCP
	7	0801229	桥涵施工技术	3	160	中国	面授	GCP
	8	0801259	公路施工组织设计	2	128	中国	面授	GCP
	9	0801239	公路工程计量与计价	2	128	中国	面授	GCP
	10	0801249	公路与桥梁检测技术	2	128	中国	面授	GCP

	11	0801581	公路养护与管理	2	128	中国	面授	GCP
	12	0801959	BIM 技术应用	2	128	中国	面授	GCP
	小计			25	1504			

(二) 教学进程表

2022 级道路与桥梁工程技术（中外合作办学）专业课程设置与教学安排表

课程类别	序号	课程代码	课程名称	学分	计划学时			教学周学时/教学周数					教学地点	授课机构	
					总学时	理论	实践	二	三	四	五	六			
								20 周	20 周	20 周	20 周	18 周			
公共基础及素质类课程	1	Gen 111	伊斯兰&巴基斯坦学习	Islami at & Pakist an Studie s	1	32	32	0	32				巴基斯坦	面授	GCT, Taxila
	2	Gen 211	伊斯兰&巴基斯坦学习	Islami at /Pakis tan Studie s	1	32	32	0		32			巴基斯坦	面授	GCT, Taxila
	3	Gen 311	伊斯兰&巴基斯坦学习	Islami at & Pakist an Studie s	1	32	32	0			32		中国	网络	GCT-Taxila (Online)
	4	0801909	汉语 I	Chines e I	2	64	64	0	64				巴基斯坦	网络+面授	Blended (GCP, online GCT, Taxila)
	5	0801919	汉语 II	Chines e II	2	64	64	0		64			巴基斯坦	网络+面授	Blended (GCP, online GCT, Taxila)

	6	0801929	中国概况	Unders tandin g Chin a	2	64	64	0		64			巴基 斯坦	网络 +面 授	Blended (GCP, online GCT, Taxila)
	7	Eng 112	英语	Englis h	2	64	64	0	64				巴基 斯坦	面授	GCT, Taxila
	8	Math 113	应用数学 I	Applie d Mathem atics-I	3	96	96	0	96				巴基 斯坦	面授	GCT, Taxila
	9	Ch 112	应用化学	Applie d Chemis try	2	12 8	32	96	128				巴基 斯坦	面授	GCT, Taxila
	10	Phy 122	应用物理	Applie d Physic s	2	12 8	32	96	128				巴基 斯坦	面授	GCT, Taxila
	11	Comp 111	计算机应用	Comput er Applic ations	1	96	0	96	96				巴基 斯坦	面授	GCT, Taxila
	小计					512		28 8							
专业 基础 类 课 程	1	Civil 104	基础民用工程测量	Basic Civil Engine ering Survey ing	4	25 6	64	192	256				巴基 斯坦	面授	GCT, Taxila
	2	Civil 143	基础民用工程绘图	Basic Civil	3	22 4	32	192	224				巴基 斯坦	面授	GCT, Taxila

				Engine ering Drawin g										
3	0801119	道路工程材料	Road Engine ering Materi als	2	12 8	32	96	128				巴基 斯坦	面授	Blended (GCP, online GCT, Taxila)
4	0801539	房屋建设工程学	Buildi ng Constr uction	1	32	32	0	32				巴基 斯坦	面授	Blended (GCP, online GCT, Taxila)
5	Math 212	应用数学 II	Applie d Mathem atics- II	2	64	64	0		64			巴基 斯坦	面授	GCT, Taxila
6	Civil 203	公共卫生技术	Public Health Techno logy	3	16 0	64	96		160			巴基 斯坦	面授	GCT, Taxila
7	0801609	结构设计原理	Princi ples o f Stru cture Design	2	64	64	0		64			巴基 斯坦	网络 +面授	Blended (GCP, online GCT, Taxila)
8	Civil 223	高级建设工程技 术	Advanc ed Constr uction Techni ques	3	16 0	64	96		160			巴基 斯坦	面授	GCT, Taxila
9	Civil 263	工程力学	Engine	3	16	64	96		160			巴基	面授	GCT, Taxila

				ering Mechan ics		0							斯坦		
	1 0	Civil 232	工程计量	Quanti ty Survey ing	2	12 8	32	96		128			巴基 斯坦	面授	GCT, Taxila
	1 1	Civil 271	企业家精神	Entrep reneur ship	1	32	32	0		32			巴基 斯坦	面授	GCT, Taxila
	小计					544		86 4							
专业 核心 类 课程	1	0801339	道路工程测量	Road Engine ering Survey ing	2	12 8	32	96		128			巴基 斯坦	网络 +面 授	Blended (GCP, online GCT, Taxila)
	2	0801939	道路与桥梁工程 技术专业汉语	“Chin ese” for Road And Bridge Engine ering Techno logy	1	32	32	0			2/8	2/8	中国	面授	GCP
	3	0801949	道路工程制图, 识图和 AutoCAD	Road Engine ering Drawin g, Drawin g	3	16 0	64	96			4/16+4 8/2		中国	面授	GCP

				Recognition & Auto CAD											
	4	0801579	道路勘测设计	Road Survey And Design	2	12 8	32	96			4/8+48 /2		中国	面授	GCP
	5	0801149	土力学与基础工程	Soil Mechan ics And Founda tion Engine ering	2	12 8	32	96			4/8+48 /2		中国	面授	GCP
	6	0801219	路基路面工程	Roadbe d And Paveme nt Engine ering	2	12 8	32	96			4/8+48 /2		中国	面授	GCP
	7	0801229	桥涵施工技术	Bridge And Culver t Constr uction Techno logy	3	16 0	64	96				4/16+4 8/2	中国	面授	GCP
	8	0801259	公路施工组织设计	Highwa y Constr uction Organi	2	12 8	32	96				4/8+48 /2	中国	面授	GCP

			zation Plan											
9	0801239	公路工程计量与 计价	Measur ement And Valuat ion	2	12 8	32	96				4/8+48 /2	中国	面授	GCP
1 0	0801249	公路与桥梁检测 技术	Highwa y And Bridge Inspec tion Techno logy	2	12 8	32	96				4/8+48 /2	中国	面授	GCP
1 1	0801581	公路养护与管理	Highwa y Mainte nance And Manage ment	2	12 8	32	96				4/8+48 /2	中国	面授	GCP
1 2	0801959	BIM 技术应用	Applic ation Of BIM Techno logy	2	12 8	32	96			4/8+48 /2		中国	面授	GCP
小计						448		10 56						
总学分、总学时、必修课+限选课周 学时合计						70	2208							

注:

1.学分:

理论课 32 课时对应 1 学分; 实践课 96 课时对应 1 学分。

2.授课机构:

GCT, Taxila 代表 GOVT. COLLEGE OF TECHNOLOGY, TAXILA 塔克西拉省立技术学院
GCP 代表 GUANGDONG CONSTRUCTION POLYTECHNIC 广东建设职业技术学院

(三) 教学学时分配

课程性质、类别	小计		小计	
	学时	比例	学分	比例
公共基础及素质类课程	800	22%	19	27%
专业基础类课程	1408	38%	26	37%
专业核心课程	1504	41%	25	36%
合计	3712	100%	70	100%

附件一：注册文件和证明文件清单

Annex One: List of Registration Documents and Proof Documents

序列号	文件类型	数量	要求
1	护照	1	电子扫描件
2	最高学历证书	1	电子扫描件
3	最高学位成绩单	1	电子扫描件
4	近期电子护照头像	1	电子扫描件

1. 学籍注册文件清单

1. Registration Documents

NO.	Document type	Quantity	Requirements
1	Passport	1	Electronic scan
2	Highest degree certificate	1	Electronic scan
3	Highest degree transcript	1	Electronic scan
4	Recent e-passport photo	1	Electronic scan

2. 甲方入学证明文件清单

序列号	文件类型	数量	要求
1	护照	1	电子扫描件
2	最高学历证书	1	电子扫描件
3	在乙方学习成绩单	1	电子扫描件
4	体检表	1	电子扫描件
5	自我介绍	1	原件和电子扫描件
6	无犯罪记录证明	1	原件和电子扫描件
8	HSK 等级证书	1	原件和电子扫描件
9	近期电子护照头像	1	电子扫描件

2. Proof Documents upon admission in Party A

NO.	Document type	Quantity	Requirements
1	Passport	1	Electronic scan
2	Highest degree certificate	1	Electronic scan
3	Transcript while study in Party B	1	Electronic scan
4	Copy of medical examination form	1	Electronic scan
5	Self-introduction (about 500 words)	1	Original and Electronic scan
6	Certificate of Good Conduct	1	Original and Electronic scan
8	HSK Level Certificate	1	Original and Electronic scan
9	Recent e-passport photo	1	Electronic scan

附录二：人才培养方案英文版

CURRICULUMS For THREE YEARS' DIPLOMA OF ASSOCIATE ENGINEER IN

ADVANCED CONSTRUCTION TECHNOLOGY

Spe. In Road and Bridge Technology

Entry Level: - Matriculation Exam(Science)

Duration of Course: - Three Years

Credit Hours: **70** (Annual System)

Methodology: Theory 40%

Practical 60%

Examination & Certification Body: Punjab Board of Technical Education

Examination System: Annual System (the same as other DAEs programs)

Technical Education and Vocational Training
Institution

TEVTA

SCHEME OF STUDIES

DAE Advance Construction/ Road & Bridge TECHNOLOGY (3-Years' Course)

FIRST YEAR					
Code	Subject Name	T	P	C	Taught by
Gen 111	Islamiat & Pakistan Studies	1	0	1	GCT, Taxila
0801909	Chinese I	2	0	2	Blended (GCP, online GCT, Taxila)
Eng 112	English	2	0	2	GCT, Taxila
Math 113	Applied Mathematics-I	3	0	3	GCT, Taxila
Ch 112	Applied Chemistry	1	3	2	GCT, Taxila
Phy 122	Applied Physics	1	3	2	GCT, Taxila
Civil 104	Basic Civil Engineering Surveying	2	6	4	GCT, Taxila
Civil 143	Basic Civil Engineering Drawing	1	6	3	GCT, Taxila
0801119	Road Engineering Materials	1	3	2	Blended (GCP, online GCT, Taxila)
0801539	Building Construction	1	0	1	Blended (GCP, online GCT, Taxila)
Comp 111	Computer Applications	0	3	1	GCT, Taxila
	Total	15	24	23	
SECOND YEAR					
Code	Subject Name	T	P	C	Taught by
Gen 211	Islamiat /Pakistan Studies	1	0	1	GCT, Taxila
Math 212	Applied Mathematics-II	2	0	2	GCT, Taxila
0801929	Understanding China	2	0	2	Blended (GCP, online GCT, Taxila)
0801919	Chinese II	2	0	2	Blended (GCP, online GCT, Taxila)
Civil 203	Public Health Technology	2	3	3	GCT, Taxila
0801339	Road Engineering Surveying	1	3	2	Blended (GCP, online GCT, Taxila)
0801609	Principles of Structure Design	2	0	2	Blended (GCP, online GCT, Taxila)
Civil 223	Advanced Construction Techniques	2	3	3	GCT, Taxila
Civil 263	Engineering Mechanics	2	3	3	GCT, Taxila
Civil 232	Quantity Surveying	1	3	2	GCT, Taxila
Civil 271	Entrepreneurship	1	0	1	GCT, Taxila
	Total	18	15	23	

THIRD YEAR					
Code	Subject Name	T	P	C	Taught by
Gen 311	Islamiat & Pakistan Studies	1	0	1	GCT-Taxila (Online)
0801939	"Chinese" for Road And Bridge Engineering Technology	1	0	1	GCP
0801949	Road Engineering Drawing, Drawing Recognition & Auto CAD	2	3	3	GCP
0801579	Road Survey And Design	1	3	2	GCP

0801149	Soil Mechanics And Foundation Engineering	1	3	2	<u>GCP</u>
0801219	Roadbed And Pavement Engineering	1	3	2	<u>GCP</u>
0801229	Bridge And Culvert Construction Technology	2	3	3	<u>GCP</u>
0801259	Highway Construction Organization Plan	1	3	2	<u>GCP</u>
0801239	Highway Engineering Measurement And Valuation	1	3	2	<u>GCP</u>
0801249	Highway And Bridge Inspection Technology	1	3	2	<u>GCP</u>
0801581	Highway Maintenance And Management	1	3	2	<u>GCP</u>
0801959	Application Of BIM Technology	1	3	2	<u>GCP</u>
	Total	14	30	24	

DAE CIVIL TECHNOLOGY

YEAR 1

اسلامیات / مطالعہ پاکستان

GEN III

ٹی پی سی
1 0 1

کل وقت: 20 گھنٹے

سہل اول

حصہ اول اسلامیات
حصہ دوم مطالعہ پاکستان
موضوعات حصہ اول اسلامیات
کتاب و سنت
حصہ اول

1- حصہ اسلامیات

2-

مدرسہ مقاصد

1- قرآن مجید

عمومی مقصد: طالب علم یہ سمجھنے کے قابل ہو کہ اسلام کی تعلیمت کا اصل سرچشمہ قرآن مجید ہے۔

خصوصی مقصد: طالب علم اس قتل ہو جائے گا کہ

ترتیب مجید کی تعریف کر سکے گا

ترتیب مجید کے نزول کی صورت بیان کر سکے

قرآن مجید کی کئی روایتی سورتوں کی پہچان کر سکے

مختار آیات کا ترجمہ و تشریح کر سکے

عمومی مقصد: یہ سمجھنے کے قابل ہو کہ قرآن مجید کے ذریعے اسلامی تعلیمت کا مقصود کیا ہے۔

قرآنی آیات کا ترجمہ و تشریح کر سکے

قرآنی تعلیمت کی روشنی میں اپنی اور معاشرتی اصلاح کر سکے

2.1

2- سنت

عمومی مقصد: طالب علم سنت نبوی کی اہمیت اور ضرورت کو اچھی طرح سمجھنے کے قابل ہو جائے گا

خصوصی مقصد:

سنت کی تعریف بیان کر سکے

سنت کی اہمیت و ضرورت کی وضاحت کر سکے

سنت کی روشنی میں امور حسنہ پر عمل کر سکے

مختار احادیث کا ترجمہ

عمومی مقصد: احادیث کی روشنی میں اخلاقی اقدار سے سکھای حاصل کر سکے

خصوصی مقصد: احادیث کا ترجمہ و تشریح کر سکے

رسول اللہ ﷺ کے اقوال و سنت کا، احادیث کا ترجمہ و تشریح کر سکے

دین اسلام
 عمومی مقاصد: دین اسلامی کے بنیادی مقاصد اور عبادات کے بارے میں جان سکے اور بیان کر سکے
 خصوصی مقاصد
 لفظ دین اسلام کے لغوی اور اصطلاحی معنی بیان کر سکے
 اسلام کے بنیادی مقاصد کی اہمیت بیان کر سکے
 اسلام کے بنیادی مقاصد سے انسان کی اخروی و دنیوی زندگی، برائیوں والے اثرات جان کر سکے
 (غیر مسلم طلباء کے لئے)

کے 3

0

کل وقت - 20 گھنٹے

GEN III

نصاب اخلاقیات (اسلام) نول

حصہ دوم: معاشی و اخلاقی

موضوعات

اخلاقیات کی تعریف اور اہمیت
 اخلاقیات کا معیار (قانون: عقل، الحی، نسب)
 مندرجہ اعلیٰ اخلاق کی وضاحت

☆ دولت داری

☆ وفا داری

نصاب اخلاقیات (اسلام) نول

تدریسی مقاصد

عمومی مقاصد: اعلیٰ اخلاق کی وجہ سے ان کی ترقی میں تھل قدر اضافہ کر سکے

خصوصی مقاصد: طلباء اس علم سے اپنی تھل ہو گا کہ

☆ موضوعات کا مطلب بیان کر سکے

☆ عملی زندگی سے متعلق کی نشاندہی کر سکے

☆ اپنی شخصیت اور معاشرے پر موضوعات کے مثبت اثرات پیدا کرنے کے طریقے جان کر سکے

☆ وراثت داری کی اہمیت بیان کر سکے

☆ وفا داری کی اہمیت بیان کر سکے

☆ لقم و ضبط کی تعلیمات بیان کر سکے

☆ صدق بیان کی ضرورت بیان کر سکے

☆ حوصلہ مندی کے فوائد بیان کر سکے

☆ ریاضت کی پابندی کے فوائد بیان کر سکے

☆ صفائی اور باہمی اختیار سے حسن نگہداشت کو بیان کر سکے

☆ مصلحت کے فوائد بیان کر سکے

طالب علم یہ جان لے کہ اسلام میں اور مسلمان قوم میں آزادیِ فکری کیا اہمیت ہے
خصوصی مقاصد

- ۱۵۰ حریت فکر کا معنی و مفہوم بیان کر سکے
- ۱۵۱ آزادیِ فکری اہمیت بیان کر سکے
- ۱۵۲ خصوصاً "اسلام میں آزادیِ اظہار و رائے کی اہمیت بیان کر سکے
- ۱۵۳ ذاتی غلامی کے قومی سطح پر نقصانات کے بیان کر سکے
- ۱۵۴ دوسلانی غلامی قومی سطح پر نقصانات بیان کر سکے

نظریہ پاکستان

عمومی مقصد:

نظریہ پاکستان (دین اسلام) سے ہماری طرح واقفیت ہو جائے

خصوصی مقاصد:

- ۱۵۵ نظریہ کی تعریف بیان کر سکے اور اس کی وضاحت کر سکے
- ۱۵۶ نظریہ پاکستان کی تعریف کر سکے اور اس کا مفہوم بیان کر سکے
- ۱۵۷ علامہ اقبال اور قائد اعظم کے فرمودات کی روشنی میں نظریہ پاکستان بیان کر سکے

نظریہ پاکستان کا تاریخی پسو

عمومی مقصد

نظریہ پاکستان کے تاریخی پس منظر سے واقفیت حاصل کر سکے

خصوصی مقاصد:

- ۱۵۸ محمد بن قاسم کے بارے میں بیان کر سکے

- ۱۰۰ محمد بن قاسم کے ہندوستان پر حملہ کی وجہ بیان کر سکے
- ۱۰۱ محمد بن قاسم کے ہندوستان پر حملہ کے اثرات بیان کر سکے
- ۱۰۲ بیان کر سکے کہ ہندوستان میں ہندو مسلم دو قومی نظریہ کا کونسا آغاز کیا ہے
- ۱۰۳ مہدولف طائی کی علمی خدمات بیان کر سکے
- ۱۰۴ شہدولی اللہ کی علمی خدمات بیان کر سکے
- ۱۰۵ مہدولف طائی اور شہدولی اللہ نے جو تبلیغ دین اور مسلمانوں میں برائی شعور پیدا کیا اسے بیان کر سکے

علمی تحریکیں

- علم میں متعدد
- ۱۰۶ برصغیر کی علمی تحریکوں سے آگاہی حاصل کر سکے
- تصویریں ملاحظہ:
- ۱۰۷ ملی مرکز - راجہ بندر - ترویج العلماء خدمت الاسلام، اسلامیہ کالج - ایمن حمایت اسلام نے تعلیم کے ذریعہ برائی شعور مسلمانوں میں پیدا کیا اسے بیان کر سکے
- ۱۰۸ آذربائی ہند کے سلسلہ میں تحریک مجاہدین کی خدمات بیان کر سکے

0801909 CHINESE COURSE I

Total contact hours

Theory	64	T	P	C
Practical	0	2	0	2

PART ONE

AIMS This course consists of 18 classes (including mid-term test and final test). After completing this part, students can master the primary Chinese language knowledge taught in the content of the course, and be able to achieve and exceed the **HSK level One**.

INSTRUCTION OBJECTIVE The course is mainly for zero-based learners. Through the study of this course, learners can lay a solid language foundation and have a preliminary understanding of Chinese language structure, including Pinyin, Chinese characters, words, grammar and other knowledge. After completing this course, learners can understand and use some basic words and sentences, and complete the most basic communication, such as greeting, asking, introducing, shopping and so on.

COURSE CONTENTS

- 1. Lesson 1 Hello Vs Nǐhǎo**
1 hour
This lesson briefly introduces pinyin and spelling methods.
- 2. Hello!**
1 hour
This lesson briefly introduces the sentence patterns used in greeting, such as dialogue, greeting farewell, and introducing one's own name.
- 3. Lesson 3 I am Thai**
2 hour
Teach students to understand basic classroom language, learn to use "national + person" for simple communication dialogue, and introduce which country they come from.
- 4. Lesson 4 What's the date today**
2 hour
This lesson introduces the expression of numbers, years, months, etc., and teaches students to ask about a date and answer it.
- 5. Lesson 5 This is my brother**
2 hours
By introducing family members, students can understand the simple words when asking about family status and introduce them briefly.
- 6. Lesson 6 I'm nineteen years old**
2 hours
This lesson expands quantifiers and animal names, and introduces the expression of age, so that students can ask and answer each other's age correctly.
- 7. Lesson 7 What time is it**
2 hours
This lesson introduces the usage of hours, minutes and seconds, so that students can describe their lives with time points.
- 8. Lesson 8 What do you like to do on weekends**
2 hours

This lesson introduces the expressions of hobbies, interests, activities and other related nouns, so as to help students communicate with each other by using simple linking sentences.

Semi-MID-TERM REVIEW

2 hours

Mid-term review is a summary of the knowledge learned in the past. The test paper uses the knowledge points learned in the past to design listening questions, answering questions by looking at pictures, connecting questions, filling in blanks, etc., which are illustrated with pictures and interesting, and can test students' learning effect.

9. Lesson 9 Introduce yourself

2 hours

Explain the related expressions related to self-introduction, and students can correctly introduce their names, families, ages, hobbies, school majors, etc. 2

10. Lesson 10 My father is in Beijing

2 hours

This lesson introduces the names of major cities in China, Britain and Europe, and introduces the use of "person + place" in sentences.

11. Lesson 11 I came to Beijing by plane

2 hours

This lesson introduces the means of transportation and how to express long sentences in combination with the time and place learned before.

12. Lesson 12 I eat at the company 2 hours

2 hours

This lesson introduces the polite expressions used in eating.

13. Lesson 13 The weather is fine on Monday

2 hours

It shows the conversations and topics that may appear when you want to date.

14. Lesson 14 How much is it altogether

2 hours

This lesson introduces the vocabulary and sentences commonly used in shopping, and how to use Chinese for daily shopping.

15. Lesson 15 What would you like to have

2 hours

This lesson introduces the classic Chinese and Thai cuisine, the terms of treating guests, and the communicative terms of how to order food in restaurants.

16. Lesson 16 The bathroom is next to the pantry

2 hours

This lesson introduces location and location words, and how to use location words to introduce the location of a place.

Semi- FINAL REVIEW

2

hours

Similar to the mid-term test questions, it is a test of important knowledge points of the course to test students' learning effect. This lesson briefly introduces pinyin and spelling methods.

PART TWO

AIMS After completing this part, students can master the basic Chinese language knowledge taught in the content of the course, and be able to reach and exceed **HSK level TWO**.

INSTRUCTION OBJECTIVE Learners can master the language knowledge and use some basic grammar and sentence patterns in communication, learn to express personal feelings and attitudes in Chinese, and can complete communicative functions such as gratitude, apology, introduction and farewell, and begin to understand Chinese cultural knowledge and cultivate interest in learning.

COURSE CONTENTS

1. Lesson 1 I was still sleeping at 7 o'clock

1 hour

This lesson introduces the grammatical points of "still", so that students can correctly understand the meaning of sentences related to "still" and use this sentence pattern correctly for communication.

2. Lesson 2 It will be cloudy tomorrow

1 hour

By introducing the weather in several Chinese cities, explain how to use temperature to answer weather questions.

3. Lesson 3 That one is five hundred dollars cheaper than this one

1 hour

This lesson explains comparative sentences, and compares them in terms of price, height and temperature, so that students can understand comparative sentences thoroughly.

4. Lesson 4 This is a family photo

1 hour

This lesson introduces family members in detail through appearance, clothing and occupation, so that students can master more detailed description methods.

5. Lesson 5 It is forbidden to take pictures here

2 hours

This lesson leads students to understand the relevant knowledge points of expressing commands, such as forbidden and forbidden, so that students can correctly understand the meaning of words in daily life.

6. Lesson 6 I can't find something

2 hours

This lesson introduces the use of language points in "V + should + result complement", so that students can correctly use relevant sentence patterns in communication.

7. Lesson 7 I have been to Sichuan and seen pandas

2 hours

This lesson introduces Chinese culture through "V + have been to", such as the Great Wall, the Forbidden City, national treasures, etc., so that students can use this sentence pattern correctly in communication.

8. Lesson 8 I hope you can come to my wedding

2 hours

By introducing Chinese weddings, this lesson enables students to master the verbal usage of banquet invitation, holiday blessing, emotional expression and euphemistic refusal.

Semi-MID-TERM REVIEW
hours

This section leads students to review the knowledge points they have learned in the past and conduct mid-term tests through reading pictures, listening questions and connecting questions to test students' learning effect.

9. Lesson 9 Be ill, take more rest

2 hours

This lesson introduces the vocabulary related to illness and the doctor's medication advice, so that students can correctly describe and understand the doctor's meaning in the process of seeing a doctor.

10. Lesson 10 The station is just across the road

2 hours

This lesson introduces the way of asking places and answers by asking directions, which helps students to use relevant sentence patterns for practical communication questions and answers.

11. Lesson 11 She sings very well

2 hours

This lesson focuses on hobbies and introduces the correct use of related words in sentences.

12. Lesson 12 Did you do well in the exam

2 hours

By describing the examination process and the situation of answering questions, students can correctly understand the instructions of the examination room, the distribution of questions and the analysis of test paper problems

13. Lesson 13 Buy two and get one free

2 hours

This lesson introduces the commodity names of supermarkets, as well as common terms such as promotional activities, discounts and price reductions.

14. Lesson 14 We're a new restaurant

2 hours

This lesson helps students understand how to understand the waiter's recommendation and put forward the food requirements for ordering.

15. Lesson 15 The girl is dressed in white clothes

2 hours

This lesson introduces others' clothes and how to use grammar points to describe the state of something through "V + be dressed in".

16. Lesson 16 You can be discharged from hospital next week

2 hours

This lesson introduces a variety of expressions, such as hospitalization, visiting patients and discharge, so that students can understand the language of hospital scenes and strengthen their multi-scene communication ability.

Semi- FINAL REVIEW

2 hours

This section is similar to the mid-term review, which leads students to review the knowledge points they have learned in the past and conduct final tests by looking at pictures, listening questions, connecting questions, etc., to test students' learning effect.

Recommended Book*Tang Chinese Course 1 for PART TWO**Tang Chinese Course 2 for PART TWO***Eng-112 ENGLISH****Total contact hours**

Theory	64	T	P	C
Practical	0	2	0	2

AIMS At the end of the course, the students will be equipped with cognitive skill to enable them to present facts in a systematic and logical manner to meet the language demands of dynamic field of commerce and industry for functional day-to-day use and will inculcate skills of reading, writing and comprehension.

COURSE CONTENTS**ENGLISH PAPER "A"****1. PROSE/TEXT****16 hrs**

1.1 First eight essays of Intermediate. English Book-II

2. CLOZE**TEST****4 hrs**

1.2 A passage comprising 50-100 words will be selected from the text. Every 11th word or any word for that matter will be omitted. The number of missing word will range between 5-10. The chosen word may or may not be the one used in the text, but it should be an appropriate word.

ENGLISH PAPER "B"**3. GRAMMAR****26 hrs**

3.1 Sentence Structure.

3.2 Tenses.

3.3 Parts of speech.

3.4 Punctuation,

3.5 Change of Narration.

3.6 One word for several

3.7 Words often confused

4. COMPOSITION**8 hrs**

4.1 Letters/Messages

4.2 Job application letter

4.3 For character certificate/for grant of scholarship

4.4 Telegrams, Cablegrams and Radiograms, Telexes, Facsimiles

4.5 Essay writing

4.6 Technical Education, Science and Our life, Computers,

Environmental Pollution, Duties of a Student.

4 hrs

5. TRANSLATION

6 hrs

5.1 Translation from Urdu into English.

For Foreign Students: A paragraph or a dialogue.

RECOMMENDED BOOKS

1. Technical English developed by Mr. Zia Sarwar, Mr. Habib-ur –Rehman, Evaluated by Mr.Zafar Iqbal Khokhar, Mr. ZahidZahoor, Vol - I, National Book Foundation

Eng-112 ENGLISH

INSTRUCTIONAL OBJECTIVES

PAPER-A

1. DEMONSTRATE BETTER READING, COMPREHENSION AND VOCABULARY

- 1.1 Manipulate, skimming and scanning of the text.
- 1.2 Identify new ideas.
- 1.3 Reproduce facts, characters in own words
- 1.4 Write summary of stories

2. UNDERSTAND FACTS OF THE TEXT

- 2.1 Rewrite words to fill in the blanks recalling the text.
- 2.2 Use own words to fill in the blanks.

PAPER-B

3. APPLY THE RULES OF GRAMMAR IN WRITING AND SPEAKING

- 3.1 Use rules of grammar to construct meaningful sentences containing a subject and a predicate.
- 3.2 State classification of time, i.e. present, past and future and use verb tense correctly in different forms to denote relevant time.
- 3.3 Identify function words and content words.
- 3.4 Use marks of punctuation to make sense clear.
- 3.5 'Relate what a person says in direct and indirect forms.
- 3.6 Compose his writings.
- 3.7 Distinguish between confusing words.

4. APPLY THE CONCEPTS OF COMPOSITION WRITING TO PRACTICAL SITUATIONS

- 4.1 Use concept to construct applications for employment, for character certificate for grant of scholarship.
- 4.2 Define and write telegrams, cablegrams and radiograms, telexes, facsimiles
- 4.3 Describe steps of a good composition writing.
- 4.4 Describe features of a good composition.
- 4.5 Describe methods of composition writing.
- 4.6 Use these concepts to organize facts and describe them systematically in practical situation;

5. APPLIES RULES OF TRANSLATION

- 5.1 Describe confusion.
- 5.2 Describe rules of translation.
- 5.3 Use rules of translation from Urdu to English in simple paragraph and

sentences.

Total contact hours	96	T	P	C
Theory		3	0	3

AIMS After completing the course the students will be able to

- ## COURSE CONTENTS

EQUATIONS

- 1.1 Standard Form
- 1.2 Solution
- 1.3 Nature of roots
- 1.4 Sum & Product of roots
- 1.5 Formation
- 1.6 Problems

PROGRESSION

AND

SERIES

3Hrs

- 2.1 Sequence
- 2.2 Series
- 2.3 nth term
- 2.4 Sum of the first n terms
- 2.5 Means
- 2.6 Problems

PROGRESSION

AND

SERIES

3Hrs

- 3.1 nth term
- 3.2 sum of the first n terms
- 3.3 Means
- 3.4 Infinite Geometric progression
- 3.5 Problems

THEOREM

6 Hrs

- 4.1 Factorials
- 4.2 Binomial Expression
- 4.3 Binomial Co-efficient
- 4.4 Statement
- 4.5 The General Term
- 4.6 The Binomial Series.
- 4.7 Problems

FRACTIONS

- 5.1 Introduction
- 5.2 Linear Distinct Factors Case I
- 5.3 Linear Repeated Factors Case II
- 5.4 Quadratic Distinct Factors Case III
- 5.5 Quadratic Repeated Factors Case IV
- 5.6 Problems

TRIGONOMETRY

- 6.1 Angles
- 6.2 Quadrants
- 6.3 Measurements of Angles
- 6.4 Relation between Sexagesimal & circular system
- 6.5 Relation between Length of a Circular Arc & the Radian Measure of its centralAngle
- 6.6 Problems

AND RATIOS

- 7.1 trigonometric functions of any angle
- 7.2 Signs of trigonometric Functions
- 7.3 Trigonometric Ratios of particular Angles
- 7.4 Fundamental Identities
- 7.5 Problems

IDENTITIES

- 8.1 The Fundamental Law
- 8.2 Deductions
- 8.3 Sum & Difference Formulae
- 8.4 Double Angle Identities
- 8.5 Half Angle Identities
- 8.6 Conversion of sum or difference to products
- 8.7 Problems

TRIANGLES

- 9.1 The law of Sine's
- 9.2 The law of Cosines
- 9.3 Measurement of Heights & Distances
- 9.4 Problems

SOLIDS

- 10.1 Review of regular plane figures and Simpson's Rule
- 10.2 Prisms
- 10.3 Cylinders
- 10.4 Pyramids
- 10.5 Cones

- 10.6 Frusta
- 10.7 Spheres

11 VECTORS

9 Hrs

- 11.1 Scalars & Vectors
- 11.2 Addition & Subtraction
- 11.3 The unit Vectors $\mathbf{i}$, $\mathbf{j}$, $\mathbf{k}$
- 11.4 Direction Cosines
- 11.5 Scalar or Dot Product
- 11.6 Deductions
- 11.7 Dot product in terms of orthogonal components
- 11.8 Deductions
- 11.9 Analytic Expression for $\mathbf{a} \times \mathbf{b}$.
- 11.10 Problems.

12 MATRICES

AND

DETERMINANTS

9 Hrs

- 12.1 Definition of Matrix
- 12.2 Rows & Columns
- 12.3 Order of a Matrix
- 12.4 Algebra of Matrices
- 12.5 Determinants
- 12.6 Properties of Determinants
- 12.7 Solution of Linear Equations
- 12.8 Problems

REFERENCE BOOKS

Applied Mathematics Math-113, by Nasir -ud-Din Mahmood, Sana-ullah Khan, Tahir Hameed, Syed Tanvir Haider, Javed Iqbal, Vol - I, National Book Foundation

Math-113 APPLIED MATHEMATICS-I

INSTRUCTIONAL OBJECTIVES

1 USE DIFFERENT METHODS FOR THE SOLUTION OF QUADRATIC EQUATIONS

- 1.1 Define a standard quadratic equation.
- 1.2 Use methods of factorization and method of completing the square for solving the equations.
- 1.3 Derive quadratic formula.
- 1.4 Write expression for the discriminant
- 1.5 Explain nature of the roots of a quadratic equation.
- 1.6 Calculate sum and product of the roots.
- 1.7 Form a quadratic equation from the given roots.
- 1.8 Solve problems involving quadratic equations.

2 UNDERSTAND APPLY CONCEPT OF ARITHMETIC PROGRESSION AND SERIES

- 2.1 Define an Arithmetic sequence and a series

- 2.2 Derive formula for the n th term of an A.P.
- 2.3 Explain Arithmetic Mean between two given numbers
- 2.4 Insert n Arithmetic means between two numbers
- 2.5 Derive formulas for summation of an Arithmetic series
- 2.6 Solve problems on Arithmetic Progression and Series

3 UNDERSTAND GEOMETRIC PROGRESSION AND SERIES

- 3.1 Define a geometric sequence and a series.
- 3.2 Derive formula for n th term of a G.P.
- 3.3 Explain geometric mean between two numbers.
- 3.4 Insert n geometric means between two numbers.
- 3.5 Derive a formula for the summation of geometric Series.
- 3.6 Deduce a formula for the summation of an infinite G.P.
- 3.7 Solve problems using these formulas.

4 EXPAND AND EXTRACT ROOTS OF A BINOMIAL

- 4.1 State binomial theorem for positive integral index.
- 4.2 Explain binomial coefficients: $(n,0), (n,1), \dots, (n,r), \dots, (n,n)$
- 4.3 Derive expression for the general term.
- 4.4 Calculate the specified terms.
- 4.5 Expand a binomial of a given index. -
- 4.6 Extract the specified roots
- 4.7 Compute the approximate value to a given decimal place.
- 4.8 Solve problems involving binomials.

5 RESOLVE A SINGLE FRACTION INTO PARTIAL FRACTIONS USING DIFFERENT METHODS.

- 5.1 Define a partial fraction, a proper and an improper fraction.
- 5.2 Explain all the four types of partial fractions.
- 5.3 Set up equivalent partial fractions for each type.
- 5.4 Explain the methods for finding constants involved.
- 5.5 Resolve a single fraction into partial fractions.
- 5.6 Solve problems involving all the four types.

6 UNDERSTAND SYSTEMS OF MEASUREMENT OF ANGLES.

- 6.1 Define angles and the related terms.
- 6.2 Illustrate the generation of angle.
- 6.3 Explain sexagesimal and circular systems for the measurement of angles
- 6.4 Derive the relationship between radian and degree.
- 6.5 Convert radians to degrees and vice versa.
- 6.6 Derive a formula for the circular measure of a central angle.
- 6.7 Use this formula for solving problems.

7 APPLY BASIC CONCEPTS AND PRINCIPLES OF TRIGONOMETRIC FUNCTIONS

- 7.1 Define the basic trigonometric functions/ratios of an angle as ratios of the sides of a right triangle.
- 7.2 Derive fundamental identities.
- 7.3 Find trigonometric ratios of particular angles.
- 7.4 Draw the graph of trigonometric functions.
- 7.5 Solve problems involving trigonometric functions.

8 USE TRIGONOMETRIC IDENTITIES IN SOLVING TECHNOLOGICAL

PROBLEMS

- 8.1 List fundamental identities
- 8.2 Prove the fundamental law
- 8.3 Deduce important results
- 8.4 Derive-sum and difference formulas
- 8.5 Establish half angle, double angle & triple angle formulas
- 8.6 Convert sum or difference into product& vice versa
- 8.7 Solve problems

9 USE CONCEPTS, PROPERTIES AND LAWS OF TRIGONOMETRIC FUNCTIONS FOR SOLVING TRIANGLES

- 9.1 Define angle of elevation and angle of depression.
- 9.2 Prove the law of sines and the law of cosines.
- 9.3 Explain elements of a triangle.
- 9.4 Solve triangles and the problems involving heights and distances.

10 USE PRINCIPLES OF MENSTRUATION IN FINDING SURFACES, VOLUME AND WEIGHTS OF SOLIDS.

- 10.1 Define menstruation of plane and solid figures
- 10.2 List formulas for perimeters & areas of plane figure.
- 10.3 Define pyramid and cone.
- 10.4 Define frusta of pyramid and cone.
- 10.5 Define a sphere and a shell.
- 10.6 Calculate the total surface and volume of each type of solid.
- 10.7 Compute weight of solids.
- 10.8 Solve problems of these solids.

11. USE THE CONCEPT AND PRINCIPLES OF VECTORS IN SOLVING TECHNOLOGICAL PROBLEMS.

- 11.1 Define vector quantity.
- 11.2 Explain addition and subtraction of vector
- 11.3 Illustrate unit vectors $\mathbf{i}$, $\mathbf{j}$, $\mathbf{k}$.
- 11.4 Express a vector in the component form.
- 11.5 Explain magnitude, unit vector, direction cosines of a vector.
- 11.6 Derive analytic expression for dot product and cross product of two vector.
- 11.7 Deduce conditions of perpendicularity and parallelism of two vectors.
- 11.8 Solve problems

12. USE THE CONCEPT OF MATRICES & DETERMINANTS IN SOLVING TECHNOLOGICAL PROBLEMS

- 12.1 Define a matrix and a determinant.
- 12.2 List types of matrices.
- 12.3 Define transpose, adjoint and inverse of a matrix.
- 12.4 State properties of determinants.
- 12.5 Explain basic concepts.
- 12.6 Explain algebra of matrices.
- 12.7 Solve linear equation by matrices.
- 12.8 Explain the solution of a determinant.
- 12.9 Use Crammer's Rule for solving linear equations

T	P	C
1 3	2	

Theory	32
Practical	96

AIMS: After studying this course a student will be able to;

1. Understand the significance and role of chemistry in the development of modern technology.
2. Become acquainted with the basic principles of chemistry as applied in the study of relevant Technology.
3. Know the scientific methods for production, properties and use of materials of industrial & technological significance.
4. Gains skill for the efficient conduct of practical's in a Chemistry lab.

COURSE CONTENTS			
1	INTRODUCTION	AND	FUNDAMENTAL CONCEPTS
	2 Hrs		

- 1.1 Orientation with reference to this technology
- 1.2 Terms used & units of measurements in the study of chemistry
- 1.3 Chemical Reactions & their types

2 ATOMIC STRUCTURE

- 2.1 Sub-atomic particles
- 2.2 Architecture of atoms of elements, Atomic No. & Atomic Weight
- 2.3 The periodic classification of elements periodic law
- 2.4 General characteristics of a period and group

3	CHEMICAL	BOND
2 Hrs		

- 3.1 Nature of chemical Bond
- 3.2 Electrovalent bond with examples
- 3.3 Covalent Bond (Polar and Non-polar, sigma & Pi Bonds with examples
- 3.4 Co-ordinate Bond with examples

4 WATER
2 Hrs

- 4.1 Chemical nature and properties.
- 4.2 Impurities
- 4.3 Hardness of water (types, causes & removal)
- 4.4 Scales of measuring hardness (Degrees Clark)
- 4.5 Boiler feed water, scales & treatment
- 4.6 Sea-water desalination, sewage treatment

- 5.1 Definitions with examples
- 5.2 Properties, their strength, basicity & Acidity
- 5.3 Salts and their classification with examples
- 5.4 pH-value and scale

- 6.1 The process, definition& examples
- 6.2 Oxidizing and reducing agents
- 6.3 Oxides and their classifications

- 7.1 Introduction
- 7.2 Radioactivity (alpha, beta and gamma rays)
- 7.3 Half life process
- 7.4 Nuclear reaction & transformation of elements

- 8.1 Introduction
- 8.2 Composition and manufacture
- 8.3 Chemistry of setting and hardening
- 8.4 Special purpose cements

9.1 Composition and raw material

9.2 Manufacture

9.3 Varieties and uses

- 10.1 Introduction and importance
- 10.2 Classification
- 10.3 Manufacture
- 10.4 Properties and uses

11.1 Introduction
11.2 Constituents
11.3 Preparation and uses

12 CORROSION

2 Hrs

- 12.1 Introduction with causes
- 12.2 Types of corrosion
- 12.3 Rusting of iron
- 12.4 Protective measures against-corrosion

13 REFRACTORY MATERIALS AND ABRASIVE
2 Hrs

- 13.1 Introduction to Refractories
- 13.2 Classification of Refractories
- 13.3 Properties and Uses
- 13.4 Introduction to Abrasives
- 13.5 Artificial and Natural Abrasives and their uses

14 ALLOYS
2 Hrs

- 14.1 Introduction with need
- 14.2 Preparation and Properties
- 14.3 Some Important alloys and their composition
- 14.4 Uses

15 FUELS AND COMBUSTION
2 Hrs

- 15.1 Introduction of fuels
- 15.2 Classification of fuels
- 15.3 Combustion
- 15.4 Numerical Problems of Combustion

16 LUBRICANTS
1 Hr

- 16.1 Introduction.
- 16.2 Classification.
- 16.3 Properties of lubricants.
- 16.4 Selection of lubricants:

17 POLLUTION
1 Hr

- 17.1 The problem and its dangers.
- 17.2 Causes of pollution.
- 17.3 Remedies to combat the hazards of pollution.

BOOKS RECOMMENDED

1. Text Book of Intermediate Chemistry (I & II)
2. Ilmi Applied Science by Sh. Atta Muhammad
3. Polytechnic Chemistry by J. N. Reedy Tata McGraw Hill (New Delhi)
4. Chemistry for Engineers by P.C. Jain (New Delhi, India)

Ch-112 APPLIED CHEMISTRY
INSTRUCTIONAL OBJECTIVES

1 UNDERSTAND THE SCOPE, SIGNIFICANCE AND FUNDAMENTAL

ROLE OF THE SUBJECT

- 1.1 Define chemistry and its important terms
- 1.2 State the units of measurements in the study of chemistry
- 1.3 Write chemical formula of common compounds
- 1.4 Describe types of chemical reactions with examples

2 UNDERSTAND THE STRUCTURE OF ATOMS AND ARRANGEMENT OF SUB ATOMIC PARTICLES IN THE ARCHITECTURE OF ATOMS

- 2.1 Define atom.
- 2.2 State the periodic law of elements.
- 2.3 Describe the fundamental sub atomic particles
- 2.4 Distinguish between atomic no. and mass no.; isotopes and isobars
- 2.5 Explain the arrangements of electrons in different shells and sub energy levels
- 2.6 Explain the grouping and placing of 'elements' in the periodic table

3 UNDERSTAND THE NATURE OF CHEMICAL BOND

- 3.1 Define chemical bond
- 3.2 Describe the nature of chemical bond
- 3.3 Differentiate between electrovalent and covalent bonding
- 3.4 Explain the formation of polar and non polar, sigma and pi-bond with examples
- 3.5 Describe the nature of coordinate bond with examples

4 UNDERSTAND THE CHEMICAL NATURE OF WATER

- 4.1 Describe the chemical nature of water with its formula
- 4.2 Describe the general impurities present in water
- 4.3 Explain the causes and methods to removing hardness of water
- 4.4 Express hardness in different units like mg/liter, p.p.m, degrees Clark and degrees French
- 4.5 Describe the formation and nature of scales in boiler feed water
- 4.6 Explain the method for the treatment of scales
- 4.7 Explain the sewage treatment and desalination of sea water

5 UNDERSTAND THE NATURE OF ACIDS, BASES AND SALTS

- 5.1 Define acids, bases and salts with examples
- 5.2 State general properties of acids and bases
- 5.3 Differentiate between acidity and basicity and use the related terms
- 5.4 Define salts, state their classification with examples
- 5.5 Explain p-H value of solution and pH scale

6 UNDERSTAND THE PROCESS OF OXIDATION AND REDUCTION

- 6.1 Define oxidation
- 6.2 Explain the oxidation process with examples
- 6.3 Define reduction
- 6.4 Explain reduction process with examples
- 6.5 Define oxidizing and reducing-agents and give it least six examples of each
- 6.6 Define oxides
- 6.7 Classify the oxides and give example

7 UNDERSTAND THE FUNDAMENTALS OF NUCLEAR CHEMISTRY

- 7.1 Define nuclear chemistry and radio activity

- 7.2 Differentiate between alphas, Beta and Gamma particles
- 7.3 Explain half-life process
- 7.4 Explain at least six nuclei reactions resulting in the transformation of some elements
- 7.5 State important uses of isotopes

8 UNDERSTAND THE MANUFACTURE, SETTING AND HARDENING CEMENT

- 8.1 Define port land cement and give its composition
- 8.2 Describe the method of manufacture
- 8.3 Describe the chemistry of setting and hardening of cement
- 8.4 Distinguish between ordinary and special purpose cement

9 UNDERSTAND THE PROCESS OF MANUFACTURE OF GLASS.

- 9.1 Define glass
- 9.2 Describe its composition and raw materials
- 9.3 Describe the manufacture of glass
- 9.4 explain its varieties and uses

10 UNDERSTAND THE NATURE AND IMPORTANCE OF PLASTICS POLYMERS

- 10.1 Define plastics and polymers
- 10.2 Explain the mechanism of polymerization
- 10.3 Describe the preparation and uses of some plastics/polymers

11 KNOW THE CHEMISTRY OF PAINTS, VARNISHES AND DISTEMPERS

- 11.1 Define paints, varnishes and distemper
- 11.2 State composition of each
- 11.3 State methods of preparation of each and their uses

12 UNDERSTAND THE PROCESS OF CORROSION WITH ITS CAUSES AND TYPES

- 12.1 Define corrosion
- 12.2 Describe different types of corrosion
- 12.3 State the causes of corrosion
- 12.4 Explain the process of rusting of iron
- 12.5 Describe methods to prevent/control corrosion

13 UNDERSTAND THE NATURE OF REFRACTORY MATERIALS AND ABRASIVE

- 13.1 Define refractory materials
- 13.2 Classify refractory materials
- 13.3 Describe properties and uses of refractories
- 13.4 Define abrasive.
- 13.5 Classify natural and artificial abrasives
- 13.6 Describe uses of abrasives

14 UNDERSTAND THE NATURE AND IMPORTANCE OF ALLOYS

- 14.1 Define alloy
- 14.2 Describe different methods for the preparation of alloys

- 14.3 Describe important properties of alloys
- 14.4 Enlist some important alloys with their composition, properties and uses

15 UNDERSTAND THE NATURE OF FUELS AND THEIR COMBUSTION

- 15.1 Define fuels
- 15.2 Classify fuels and make distinction of solid, liquid & gaseous fuels
- 15.3 Describe important Fuels
- 15.4 Explain combustion
- 15.5 Calculate air quantities in combustion, gases

16 UNDERSTAND THE NATURE OF LUBRICANTS.

- 16.1 Define a lubricant
- 16.2 Explain the uses of lubricants
- 16.3 Classify lubricants and cite examples
- 16.4 State important properties of oils, greases and solid lubricants
- 16.5 State the criteria for the selection of lubricant for, particular purpose/job

17 UNDERSTAND THE NATURE OF POLLUTION

- 17.1 Define Pollution (air, water, food)
- 17.2 Describe the causes of environmental pollution.
- 17.3 Enlist some common pollutants.
- 17.4 Explain methods to prevent pollution

96 Hours

1. To introduce the common apparatus, glassware and chemical reagents used in the chemistry lab.
2. To purify a chemical substance by crystallization.
3. To separate a mixture of sand and salt.
4. To find the melting point of substance.
5. To find the pH of a solution with pH paper.
6. To separate a mixture of inks by chromatography.
7. To determine the co-efficient of viscosity of benzene with the help of Ostwald viscometer.
8. To find the surface tension of a liquid with a stalagmometer.
9. To perform electrolysis of water to produce Hydrogen and Oxygen.
10. To determine the chemical equivalent of copper by electrolysis of Cu SO.
11. To get introduction with the scheme of analysis of salts for basic radicals.
12. To analyse 1st group radicals (Ag^+ - Pb^{++} - Hg^+).
13. To make practice for detection 1st group radicals.
14. To get introduction with the scheme of II group radicals.
15. To detect and confirm II-A radicals (Hg^{++} , Pb^{++} , Cu^+ , Cd^{++} , Bi^{+++}).
16. To detect and confirm II-B radicals Sn^{++} , Sb^{+++} , As^{+++}).
17. To get introduction with the scheme of III group radicals (Fe^{+++} - Al^{+++} , Cr^{+++}).
18. To detect and confirm Fe^{+++} , Al^{+++} and Cr^{+++} .
19. To get introduction with the scheme of IV group radicals.
20. To detect and confirm An^{++} and Mn^{++} radicals of IV group.
21. To detect and confirm Co^{++} and Ni^{++} radicals of IV group.
22. To get introduction with the Acid Radical Scheme.
23. To detect dilute acid group.
24. To detect and confirm CO_3^{--} and HCO_3^- radicals.
25. To get introduction with the methods/apparatus of conducting volumetric estimations.
26. To prepare standard solution of a substance.
27. To find the strength of a given alkali solution.
28. To estimate HCO_3^- contents in water.
29. To find out the %age composition of a mixture solution of KNO_3 and KOH volumetrically.
30. To find the amount of chloride ions (Cl^-) in water volumetrically.

Phy 122 APPLIED PHYSICS

Total Hours	128	T	P	C
Theory	32	1	3	2
Practical	96			

AIMS: The students will be able to understand the fundamental principles and concept of physics, use these to solve problems in practical situations/technological courses and understand concepts to learn advance physics/technical courses.

Course Contents

- 1 **Measurements.** **2 Hours**
 - 1.1 Fundamental units and derived units
 - 1.2 Systems of measurement and S.I. units
 - 1.3 Concept of dimensions, dimensional formula
 - 1.4 Conversion from one system to another
 - 1.5 Significant figures
- 2 **Scalars and Vectors.** **4 Hours**
 - 2.1 Revision of head to tail rule
 - 2.2 Laws of parallelogram, triangle and polygon of forces
 - 2.3 Resolution of a vector
 - 2.4 Addition of vectors by rectangular components
 - 2.5 Multiplication of two vectors, dot product and cross product
- 3 **Motion** **4 Hours**
 - 3.1 Review of laws and equations of motion
 - 3.2 Law of conservation of momentum
 - 3.3 Angular motion
 - 3.4 Relation between linear and angular motion
 - 3.5 Centripetal acceleration and force
 - 3.6 Equations of angular motion
- 4 **Torque, Equilibrium and Rotational Inertia.** **6 Hours**
 - 4.1 Torque
 - 4.2 Centre of gravity and centre of mass
 - 4.3 Equilibrium and its conditions
 - 4.4 Torque and angular acceleration
 - 4.5 Rotational inertia
- 5 **Wave Motion.** **5 Hours**
 - 5.1 Review Hooke's law of elasticity
 - 5.2 Motion under an elastic restoring force

- 5.3 Characteristics of simple harmonic motion
- 5.4 S.H.M. and circular motion
- 5.5 Simple pendulum
- 5.6 Wave form of S.H.M.
- 5.7 Resonance
- 5.8 Transverse vibration of a stretched string
- 6 **Sound.** **5 Hours**
 - 6.1 Longitudinal waves
 - 6.2 Intensity, loudness, pitch and quality of sound
 - 6.3 Units of Intensity of level and frequency response of ear
 - 6.4 Interference of sound waves silence zones, beats
 - 6.5 Acoustics
 - 6.6 Doppler effect.
- 7 **Light.** **5 Hours**
 - 7.1 Review laws of reflection and refraction
 - 7.2 Image formation by mirrors and lenses
 - 7.3 Optical instruments
 - 7.4 Wave theory of light
 - 7.5 Interference, diffraction, polarization of light waves
 - 7.6 Applications of polarization in sunglasses, optical activity and stress analysis
- 8 **Optical Fiber.** **2 Hours**
 - 8.1 Optical communication and problems
 - 8.2 Review total internal reflection and critical angle
 - 8.3 Structure of optical fiber
 - 8.4 Fiber material and manufacture
 - 8.5 Optical fiber - uses.
- 9 **Lasers.** **3 Hours**
 - 9.1 Corpuscular theory of light
 - 9.2 Emission and absorption of light
 - 9.3 Stimulated absorption and emission of light
 - 9.4 Laser principle
 - 9.5 Structure and working of lasers
 - 9.6 Types of lasers with brief description.
 - 9.7 Applications (basic concepts)
 - 9.8 Material processing
 - 9.9 Laser welding
 - 9.10 Laser assisted machining
 - 9.11 Micro machining
 - 9.12 Drilling, scribing and marking

9.13 Printing

9.14 Lasers in medicine

RECOMMENDED BOOKS

- 1 Tahir Hussain, Fundamentals of Physics Vol-I and II
- 2 Farid Khawaja, Fundamentals of Physics Vol-I and II
- 3 Wells and Slusher, Schaum's Series Physics .
- 4 Nelkon and Oyborn, Advanced Level Practical Physics
- 5 Mehboob Ilahi Malik and Inam-ul-Haq, Practical Physics
- 6 Wilson, Lasers - Principles and Applications
- 7 M. Aslam Khan and M. Akram Sandhu, Experimental Physics Note Book

Phy-122 APPLIED PHYSICS

Instructional Objectives

- 1 **Use Concepts of Measurement to Practical Situations and Technological Problems.**
 - 1.1 Write dimensional formulae for physical quantities
 - 1.2 Derive units using dimensional equations
 - 1.3 Convert a measurement from one system to another

- 1.4 Use concepts of measurement and Significant figures in problem solving.
- 2 **Use Concepts of Scalars and Vectors in Solving Problems Involving these Concepts.**
 - 2.1 Explain laws of parallelogram, triangle and polygon of forces
 - 2.2 Describe method of resolution of a vector into components
 - 2.3 Describe method of addition of vectors by rectangular components
 - 2.4 Differentiate between dot product and cross product of vectors
 - 2.5 Use the concepts in solving problems involving addition resolution and multiplication of vectors.
- 3 **Use the Law of Conservation of Momentum and Concepts of Angular Motion to Practical Situations.**
 - 3.1 Use law of conservation of momentum to practical/technological problems.
 - 3.2 Explain relation between linear and angular motion
 - 3.3 Use concepts and equations of angular motion to solve relevant technological problems.
- 4 **Use Concepts of Torque, Equilibrium and Rotational Inertia to Practical Situation/Problems.**
 - 4.1 Explain Torque
 - 4.2 Distinguish between Centre of gravity and centre of mass
 - 4.3 Explain rotational Equilibrium and its conditions
 - 4.4 Explain Rotational Inertia giving examples
 - 4.5 Use the above concepts in solving technological problems.
- 5 **Use Concepts of Wave Motion in Solving Relevant Problems.**
 - 5.1 Explain Hooke's Law of Elasticity
 - 5.2 Derive formula for Motion under an elastic restoring force
 - 5.3 Derive formulae for simple harmonic motion and simple pendulum
 - 5.4 Explain wave form with reference to S.H.M. and circular motion
 - 5.5 Explain Resonance
 - 5.6 Explain Transverse vibration of a stretched string
 - 5.7 Use the above concepts and formulae of S.H.M. to solve relevant problems.
- 6 **Understand Concepts Of Sound.**
 - 6.1 Describe longitudinal wave and its propagation
 - 6.2 Explain the concepts: Intensity, loudness, pitch and quality of sound
 - 6.3 Explain units of Intensity of level and frequency response of ear
 - 6.4 Explain phenomena of silence zones, beats
 - 6.5 Explain Acoustics of buildings

- 6.6 Explain Doppler effect giving mathematical expressions.
- 7 **Use the Concepts of Geometrical Optics to Mirrors and Lenses.**
 - 7.1 Explain laws of reflection and refraction
 - 7.2 Use mirror formula to solve problems
 - 7.3 Use the concepts of image formation by mirrors and lenses to describe working of optical instruments, e.g. microscopes, telescopes, camera and sextant.
- 8 **Understand Wave Theory of Light**
 - 8.1 Explain wave theory of light
 - 8.2 Explain phenomena of interference, diffraction, polarization of light waves
 - 8.3 Describe uses of polarization given in the course contents.
- 9 **Understand the Structure, Working and Uses of Optical Fiber.**
 - 9.1 Explain the structure of the Optical Fiber
 - 9.2 Explain its principle of working
 - 9.3 Describe use of optical fiber in industry and medicine.

Phy-122 APPLIED PHYSICS

List of Practicals.

- 1 Draw graphs representing the functions:
 - a. $y=mx$ for $m=0, 0.5, 1, 2$
 - b. $y=x^2$
 - c. $y=1/x$
- 2 Find the volume of a given solid cylinder using vernier callipers.
- 3 Find the area of cross-section of the given wire using micrometer screw gauge.
- 4 Prove that force is directly proportional to (a) mass, (b) acceleration, using fletchers' trolley.

- 5 Verify law of parallelogram of forces using Grave-sands apparatus.
- 6 Verify law of triangle of forces and Lami's theorem
- 7 Determine the weight of a given body using
 - a. Law of parallelogram of forces
 - b. Law of triangle of forces
 - c. Lami's theorem
- 8 Verify law of polygon of forces using Grave-sands apparatus.
- 9 Locate the position and magnitude of resultant of like parallel forces.
- 10 Determine the resultant of two unlike parallel forces.
- 11 Find the weight of a given body using principle of moments.
- 12 Locate the centre of gravity of regular and irregular shaped bodies.
- 13 Find Young's Modules of Elasticity of a metallic wire.
- 14 Verify Hooke's Law using helical spring.
- 15 Study of frequency of stretched string with length.
- 16 Study of variation of frequency of stretched string with tension.
- 17 Study resonance of air column in resonance tube and find velocity of sound.
- 18 Find the frequency of the given tuning fork using resonance tube.
- 19 Find velocity of sound in rod by Kundt's tube.
- 20 Verify rectilinear propagation of light and study shadow formation.
- 21 Study effect of rotation of plane mirror on reflection.
- 22 Compare the refractive indices of given glass slabs.
- 23 Find focal length of concave mirror by locating centre of curvature.
- 24 Find focal length of concave mirror by object and image method
- 25 Find focal length of concave mirror with converging lens.
- 26 Find refractive index of glass by apparent depth.
- 27 Find refractive index of glass by spectrometer.
- 28 Find focal length of converging lens by plane mirror.
- 29 Find focal length of converging lens by displacement method.
- 30 Find focal length of diverging lense using converging lens.
- 31 Find focal length of diverging lens using concave mirror.
- 32 Find angular magnification of an astronomical telescope.
- 33 Find angular magnification of a simple microscope (magnifying glass)
- 34 Find angular magnification of a compound microscope.
- 35 Study working and structure of camera.
- 36 Study working and structure of sextant.
- 37 Compare the different scales of temperature and verify the conversion formula.
- 38 Determine the specific heat of lead shots.
- 39 Find the coefficient of linear expansion of a metallic rod.
- 40 Find the heat of fusion of ice.
- 41 Find the heat of vaporization.
- 42 Determine relative humidity using hygrometer

DAE CIVIL TECHNOLOGY YEAR 1 Civil-104 Basic Civil Engineering Surveying				
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TOTAL CONTACT HOURS:	256	T	P	C
Theory:	64	2	6	4
Practical:	192			

AIM: To determine the relative positions of distinctive features on the surface and near the surface of the earth by means of measurements of distances, directions and elevations

Course Contents

1. **Introduction** 4 Hours
 - 1.1 Definition of surveying
 - 1.2 Primary divisions of surveying (Geodetic, Plane).
 - 1.3 Types of Surveying (According to: field of survey, Purpose of survey, Method of survey and Instrument used)
 - 1.4 Define Geographical Information Systems(GIS)
 - 1.5 Linear and angular measurement tools and instruments
 - 1.6 Fundamental principles of surveying. including reliability of a survey
 - 1.7 Trilateration- reconnaissance, ranging up, chaining up, off-setting its types and methods.
 - 1.8 Accuracy standards and reliability of chain survey.
2. **Compass Traversing** 8 Hours
 - 2.1 Introduction to compass survey.
 - 2.2 Introduction to compass, its types, parts and taking observations.
 - 2.3 Concept of meridian and its types.
 - 2.4 Introduction of whole circle bearing and reduced bearing
 - 2.5 Determination of whole circle bearing from reduced bearing and vice versa
 - 2.6 Define the traverse, its types and methods of traversing.
 - 2.7 Concept of Dip, Declination and Local attraction
 - 2.8 Plotting of compass survey and errors in compass traversing and their adjustment
3. **Plane Table Surveying** 6 Hours
 - 3.1 Introduction to plane table survey and equipment used.
 - 3.2 Setting of plane table - centring, levelling & orientation
 - 3.3 Methods of plane tabling -radiation, intersection, traversing and resection.
 - 3.4 Merits and demerits of plane table survey
4. **Levelling** 24 Hours
 - 4.1 Introduction.
 - 4.2 Definitions of terms-level line, level surface, datum line, reduced level, line of collimation, horizontal plane, vertical plane, station point, axis of telescope, axis of bubble tube etc.
 - 4.3 Bench mark and its types.
 - 4.4 Types of levelling instruments, component parts
 - 4.5 Types of levelling staves
 - 4.6 Types of levelling

- 4.7 Temporary adjustment of level
- 4.8 Finding reduced levels.
 - 4.9 Booking - height of instrument and rise & fall method, finding missing data in a level book page.
- 4.10 Classification of levelling and detailed description.
- 4.11 Errors in levelling
- 4.12 Introduction and use of Laser Level.

5 Contouring.

6 Hours

- 5.1 Definition, contour lines (contours) contour interval, horizontal equivalent
- 5.2 Purpose and use of contour map
- 5.3 Characteristics of contour lines
- 5.4 Methods of contouring
 - 5.5 Marking of alignment & grade of road, railway and canal on contour map. Computing earthwork, capacity of reservoir using trapezoidal and prismoidal rule

6 Tacheometry.

4 Hours

- 6.1 Definition, types and principles.
- 6.2 Finding horizontal distances & elevations of different objects by tacheometry.

7 Hydrographic / Bathymetric Survey.

4 Hours

- 7.1 Introduction and purpose.
 - 7.2 Soundings - sounding boat, sounding rod, still water recess, current meter, fathometer, velocity rod.
 - 7.3 Long section & cross section of a small distributory, determination of velocity and area.
- 7.4 Discharge of different sections

8. Computations of Areas and Volumes

8 Hours

- 8.1 Regular and irregular geometrical figures
 - 8.2 Area enclosed between surveying lines (railway line, highways, etc) and irregular boundary lines by:
 - 8.2.1 Mid Ordinate Rule
 - 8.2.2 Average Ordinate Rule

Recommended / Reference Books:

1. Surveying & Leveling: **T.P. Kanetkar and S.V. Kulkarni**, [2000], A.V.G Publications
2. Text Book of Surveying : **S.K. Hassan**
3. Surveying : **Hakim Ali**
4. Professional Practice in surveying and viva voce: **P.B. Shahani**
5. Rasul Manual (volume I & II) on surveying
6. Plane and Geodetic Surveying : **David Clark**

7. Surveying (theory & practice): E. Davis
8. Practical field surveying and computation: A.L. Allan
9. Guide to site surveying: Ralph Hewitt
10. Surveying: A. Bannister, S. Raymond and R. Baker, [2009], Pearson Education
11. Surveying and Levelling: R.Agor, [2007], Khanna Publishers
12. Surveying with Construction Applications: Barry F. Kavanagh, [2004], Pearson Prentice-Hall
13. Surveying, Principles and Applications: Barry F. Kavanagh, [2006], Pearson Prentice-Hall
14. Surveying and Levelling: N.N. Basak, [1994], Tata McGraw-Hill, NewDelhi
15. Fundamentals of Surveying: S.K. Roy, [2007], Prentice-Hall of India, New Delhi

Instructional Objectives

1. Know Basic Facts About Surveying

1.1 Define Surveying.

1.2 State the purpose of surveying

1.3 State the divisions (plane, geodetic) and classification of surveying based on function of survey and type of instrument used including Chain & Compass Surveying, Control surveying, Land surveying, Topographic Surveying, Engineering Surveys, Cadastral Surveys.

1.4 Describe Geographical Information Systems(GIS)

- 1.5 State the fundamental principles of surveying
- 1.6 Define chain surveying/ trilateration, reconnaissance, ranging up
- 1.7 Describe types of chain, offsets and its types

2. Compass Traversing

- 2.1 State the purpose and principles of compass traversing
- 2.2 State compass, its types, its parts and explain reading from it.
- 2.3 Define meridian and state its types
- 2.4 Define the traverse, bearing and types of bearing.
- 2.5 Solve problems relating to bearings
- 2.6 Define dip, declination & local attraction and solution of relevant problems.
- 2.7 State the types of traverse and explain methods of traversing.
- 2.8 State the methods of plotting compass traverse and adjustment of closing error.

3. Understand the Principle of Plane Table Surveying and Perform Field Work

- 3.1 State the purpose and principles of plane table surveying and identify the functions of accessories used in plane table surveying
- 3.2 Explain the operations involved in setting-up plane table and the methods of Orientation by back sighting and by Trough compass.
- 3.3 Explain the methods of plane tabling.
- 3.4 List steps involved in carrying out plane table surveying by radiation, intersection, traversing and resection.
- 3.5 State the merits and demerits of plane table surveying and list the errors in plane table surveying and precaution to be taken.

4. Understand the Principles of Levelling for Different Engineering Purposes

- 4.1 Define levelling and describe the purpose of levelling.
- 4.2 Define technical terms, level line, level surface, datum, datum line, horizontal plane, vertical plane, Horizontal line, vertical line, level line, line of collimation, Axis of telescope, bubble tube axes, back sight, foresight, Intermediate sight, change point, station point.
- 4.3 Describe bench mark and its types.
- 4.4 Identify the parts and function of various types of tilting levels and Auto set level
- 4.5 Explain with sketches levelling staves and their uses.
- 4.6 List the steps involved in performing temporary adjustment of a level.
- 4.7 Compute the reduced levels by rise & fall method and height of instrument method and recording the same on level book.
- 4.8 Determine the missing data of a level book page.
- 4.9 Define fly levelling, Longitudinal sectioning, cross-sectioning, reciprocal levelling, precise levelling, Barometric levelling .
- 4.10 State precautions in levelling operation.
- 4.11 Describe the procedures for taking readings to plot L-section x-section, and for reciprocal levelling precise levelling etc.
- 4.12 Plot X-section and L-section
- 4.13 Solve numerical problem on reciprocal levelling
- 4.14 Describe errors in levelling
- 4.15 Compute correction due to curvature and refraction
- 4.16 Describe parts and functions of Laser Level
- 4.17 Explain the procedure of levelling by use of Laser Level.

5. Understand Methods of Contouring and Computation of Volumes

- 5.1 Define the terms relating to contouring and explain characteristics and the purpose of contouring
- 5.2 Explain the uses of contour map.
- 5.3 Explain the methods of performing contour survey.
- 5.4 Interpolate contours on a plan.
- 5.5 Explain the procedure to lay down alignment of road, railway and channel on contour map and describe procedure for measuring gradient.
- 5.6 Compute the capacity of reservoirs and volume of earth from the contour map.

6. Understand the Principles of Tachometry to find the Elevations and Distances of Stations

- 6.1 Explain the principles of tachometry and enlist the method of tachometry
- 6.2 Describe the instruments used in stadia survey and state tachometric constants
- 6.3 Lists the steps involved in taking stadia observations in field to find elevations and distances of stations and compute the elevation and horizontal distances.
- 6.4 Solve examples for finding horizontal and vertical distances by tachometry

7. Understand the Principles of Hydrographic Survey

- 7.1 Define Hydrographic / Bathymetric survey and state its purposes.
- 7.2 Describe sounding, sounding rod/pole, sounding boat, still water recess, fathometer, velocity rod and current meter
- 7.3 Explain the methods of taking soundings
- 7.4 Explain procedure of determining velocity with velocity rod and current meter for determination of discharge of channel.

8. Understand the Computation of Areas and Volume

- 8.1 Describe Regular and irregular geometrical figures
- 8.2 Calculate Area enclosed between surveying lines (railway line, highways, etc) and irregular boundary lines (contours) by:-
 - i. Mid Ordinate Rule
 - ii. Average Ordinate Rule
- 8.3 Calculate Area of contours by graphical method and mechanical method (by planimeter).
- 8.4 Calculate Volume of earthwork in plane and hilly area for cutting and filling.

List Of Practicals	Hours
1. Ranging and chaining of various survey lines,	3
2. Taking different off-sets from chain line.	3
3. Setting up the compass and observation of bearings.	6
4. Compass survey of an area.	9
5. Plotting of data from compass survey	6
6. Plane table survey of an area (Temporary adjustment and radiation method).	3
7. Plane table survey of an area (intersection method and orientation).	6
8. Plane table survey of an area (Traversing method with triangular check).	6
9. Reading different types of staves.	3
10. Temporary adjustment of level and taking readings.	3

11. Simple Levelling of line	6
12. Taking reduced levels of various points and recording in the field book.	9
13. Fly levelling and finding R.Ls by height of collimation and rise fall method.	12
14. Route levelling (by auto set level).	9
15. Reciprocal levelling and its booking.	12
16. Finding and setting gradient using a level and staff.	18
17. Taking longitudinal section and cross section of a 1/2 mile long route and their plotting, marking alignment and gradient calculation of earth work.	15
18. Levelling by Laser Level (Fly Levelling, Route Levelling).	18
19. Contouring of small area by radial and square method and preparing of a contour map	9
20. Determination of horizontal distance and elevation by stadia tacheometry.	12
21. Measuring distance by Hydrographic survey of a small channel	9
22. Determination of area: enclosed between surveying line (Railway lines/Highways and irregular boundary lines in the field)	12
23. Shifting of Bench Mark by precise levelling	

DAE CIVIL TECHNOLOGY
YEAR 1
civil 143 Basic Civil Engineering Drawing

TOTAL CONTACT HOURS:	224	T	P	C
Theory:	32	1	6	3
Practical:	192			

AIM: The student will be able to:

1. Understand proper use of drawing instruments for preparation of geometric and multi-view pictorial drawings.
2. Understand the construction of various geometric figures as applicable in civil technology.
3. Apply the techniques of free hand sketching for preparation of finished sketches of given objects.

Course Contents

- | | | |
|-----------|---|---------|
| 1. | Introduction. | 2 Hours |
| 1.1 | Meanings of drafting and its scope. | |
| 1.2 | Free hand sketching of plane figures and solid figures. | |
| 2. | Engineering Drawing Instruments. | 3 Hours |
| 2.1 | Classification; basic and advance drawing tools and their uses. | |
| 2.2 | Scales. | |
| 2.3 | Line; type and selection of line thickness. | |
| 2.4 | Selection of pencil. | |
| 2.5 | File strip/block types and sizes. | |
| 3. | Lettering/Printing. | 2 Hours |
| 3.1 | Importance and types. | |
| 3.2 | Size and style. | |
| 3.3 | Lettering stencils. | |
| 4. | Geometrical Constructions. | 3 Hours |
| 4.1 | Construction of angles. | |
| 4.2 | Construction of Triangles, quadrilaterals, and polygons. | |
| 4.3 | Meaning of inscribed and circumscribed figures. | |
| 4.4 | Terms used in a circle. | |
| 4.5 | Conical curves, ellipse, parabola, hyperbola and their applications in civil engineering. | |
| 5. | Orthographic Projections. | 2 Hours |
| 5.1 | Planes including principal plane. | |
| 5.2 | Projections and projection lines. | |
| 5.3 | Dihedral and trihedral angles. | |
| 5.4 | Types of orthographic projections. | |

5.5	Principal views in 1 st & 3 rd angle	
6.	Sectioning	2 Hours
6.1	Definition & purpose of sectional views.	
6.2	Location of cutting plane- purpose of cutting plane line.	
6.3	Direction of arrowheads of CPL in 1st & 3rd angle projections.	
6.4	Position of cutting plane lines in case of full & half section.	
7.	Dimensioning.	2 Hours
7.1	Definition	
7.2	Elements in dimensioning.	
7.3	System of dimensioning.	
8.	Pictorial Drawing	3 Hours
8.1	Definition & uses.	
8.2	Brief description of different types of pictorial drawing.	
8.3	Isometric axis, angles and scales.	
8.4	Isometric arc, angles, scales.	
8.5	Oblique drawing & their uses.	
8.6	Angle of receding axis.	
8.7	Similarity between front and oblique view.	
8.8	Lettering in oblique cavalier and cabinet views.	
8.9	Perspective drawings; definition and purpose, vanishing point, parallel & Angular (diometric and trimetric) perspective, principles of making perspective views.	
9.	Auxiliary Views	1 Hours
9.1	Necessity, auxiliary plane	
9.2	Cases of auxiliary views.	
10	Development of Surfaces	1 Hours
10.1	Definition, Uses, methods of development of surfaces	
10.2	Calculation of true length, Finding Line of intersection.	
11.	Building Drawing	9 Hours
11.1	Conventions and terms used for buildings.	
11.2	Symbols used for public health & electrical installations.	
11.3	Plan; site plan, line plan, detailed plan and layout plan.	
11.4	Instructions for drawing plan, elevation and cross-section of single and double storey building.	
11.5	Instruction on baths and kitchen arrangement.	
11.6	Local Building bye-laws	
11.7	Categories of Government servant's residences (Total area & covered area)	

12. House Planning

2 Hours

- 12.1 Significance of house planning.
- 12.2 Selection of site and its governing factors.
- 12.3 Introduction to factors affecting the planning of a house, orientation, selection of material, ventilation and position of openings.

RECOMMENDED / REFERENCE BOOKS:

- 1. A text book on Basic Civil Engineering Drawing by TEVTA.
- 2. Engineering Drawing: **Parkinson.**
- 3. Engineering Drawing: **N.D. Bhat.**
- 4. Building Drawing: **Gurcharn Singh.**
- 5. First Year Drawing : **Gupta**
- 6. Civil Engineering Practice (Urdu) : **Niaz Ahmed Mirza**
- 7. Engineering Drawing: **N.D. Bhatt and V. M. Panchal**, [2006], Prabhat Publishers. Delhi

INSTRUCTIONAL OBJECTIVES

1. Understand the Need of Drafting, Civil Drafting and use of Free Hand Sketching.

- 1.1 State the importance of civil drafting as an engineering communication medium.
- 1.2 Understand necessity of civil drafting in different engineering fields.
- 1.3 Indicate the link between drafting and other subjects of study in diploma course.
- 1.4 State plane and solid figures.
- 1.5 State the difference between plane and solid figures.
- 1.6 Draw free hand sketches of different plane and solid figures.

2. Understand Different Engineering Drawing Instruments and Accessories.

- 2.1 State the different engineering drawing instruments and drawing papers.

- 2.2 State the types of scales and meaning of R.F.
- ~~2.3~~ ~~2.4~~ State the uses of hard and soft grades of pencils.
- ~~2.4~~ State the types of lines.

3. Know the Need and Types of Lettering & Printing.

- 3.1 State importance of lettering.
- 3.2 State different types of lettering.
- ~~3.3~~ ~~3.4~~ Select and use lettering stencils for a given applications.
- ~~3.4~~ State the principles of lettering.

4. Understand the Construction of Geometrical Figures.

- 4.1 State the construction of angles.
- 4.2 State different triangles quadrilaterals and polygons.
- 4.3 State difference between inscribed and circumscribed figures.
- 4.4 State the terms used in a circle.
- 4.5 Sketch and label different lines and arcs in a circle.
- 4.6 State cone, conical sections, (circle, parabola, ellipse and hyperbola).
- 4.7 Relate the conical sections in civil engineering drawings.
- 4.8 Define ellipse and parabola

5. Understand Types & Techniques of Orthographic Projections.

- 5.1 Define plane, principal plane.
- 5.2 Explain the principle of orthographic projection with simple sketches.
- 5.3 State the definition of projector and projection lines and their use.
- 5.4 State and differentiate between dihedral and trihedral angles.
- 5.5 State the types of orthographic projection.
- 5.6 Sketch the orthographic views of a simple engineering part of given pictorial drawing.
- 5.7 Identify the object from a number of orthographic views of the object.
- 5.8 Select the minimum number of views needed to fully represent a given object

6. Understand the Basics of Sectioning.

- ~~6.1~~ State the definition of section and sectioning.
- ~~6.2~~ Explain purpose of sectional views.
- 6.3 State cutting plane and cutting plane line.
- 6.4 State the purpose of cutting plane line.
- 6.5 State conventional representation of engineering materials.
- 6.6 Know rule of putting arrowhead on cutting plane line.
- 6.7 State types of sectional views.
- 6.8 Select the position of cutting plane line to give maximum details of object.
- 6.9 Explain the principles of hatching.

7. Understand Techniques of Dimensioning.

- 7.1 Define dimensioning.
- 7.2 State the need of dimensioning drawings according to accepted standards
- 7.3 State the dimension and extension line.

- 7.4 State the length of arrowhead.
- 7.5 Identify the system of placement of dimensions of a given dimensioned drawing.
- 7.6 Dimension a given drawing using standard notations and desired system of dimensioning.

8. Understand the Techniques of Pictorial Drawings.

- 8.1 Define pictorial drawing.
- 8.2 State the types of pictorial drawings and their general uses.
- 8.3 Sketch isometric axis, angles, scales, arcs and circles.
- 8.4 Differentiate between the isometric and non-isometric lines.
- 8.5 Sketch isometric drawing and isometric projection.
- 8.6 Sketch the isometric projection from the given orthographic drawings.
- 8.7 Explain the angle of receding axis.
- 8.8 State the oblique drawing and its uses.
- 8.9 Sketch and letter the oblique cavalier and cabinet views.
- 8.10 Define perspective drawing.
- 8.11 Explain the purpose of perspective drawing.
- 8.12 State the vanishing point.
- 8.13 State the principles of making perspective views.
- 8.14 State the parallel and angular (dramatic and trimetric) perspective.

9. Know the Types and Uses of Auxiliary Views.

- 9.1 State auxiliary views and auxiliary planes.
- 9.2 State necessity of auxiliary views.
- 9.3 State the types of auxiliary views i.e. primary and secondary auxiliary views.
- 9.4 State the types of auxiliary views due to their location with reference line i.e. symmetrical, unilateral and bilateral auxiliary views.
- 9.5 State the classes of primary views i.e. front top and profile auxiliary planes and oblique surfaces.
- 9.6 State the cases of secondary auxiliary views.

10. Understand the Techniques of Development of Surfaces.

- 10.1 Definition of development pattern drawing.
- 10.2 State the necessity of development of surfaces.
- 10.3 State ruled, single curved, plane and double curved surfaces.
- 10.4 State the uses of development drawings.
- 10.5 Explain the method of development i.e. right-angled triangle and revolution method.
- 10.6 State the rules for calculation of true length.
- 10.7 Sketch the development of surfaces of prism, pyramid, cylinder and cone.
- 10.8 Explain the intersection and line of intersection.
- 10.9 Explain the procedures for finding line of intersection.

11. Understand the Types and Procedures of Building Drawing.

- 11.1 Define conventional symbols and give its importance.
- 11.2 Sketch the x-section of wall with flooring and roofing
- 11.3 Label the parts of given plan.
- 11.4 State the sizes of rooms for different classes of houses.
- 11.5 Follow measurements from a given plan.
- 11.6 Define site plan, detailed plan, layout plan, index plan, elevations & sections.
- 11.7 Sketch plans elevations and sections of buildings from given line diagrams.
- 11.8 Explain the procedure for preparing plans, elevations and sections for single

- storey and double storey buildings.
- 11.10 State the different fixtures required for bath, kitchen, dining and courtyards.
 11.10 Sketch the different fixtures in kitchen and bathrooms at their proper places.

12. Know the Importance and Factors of House Planning.

- 12.1 Define House planning
 12.2 State the necessity of house planning.
 12.3 State the factors, which govern the selection of site for building
 12.4 Define orientation.
 12.5 State the factors affecting the planning of a house
 12.6 State the minimum area of the building services
 12.7 State principles of providing building services
 12.8 State the inter-relationship of different rooms
 12.9 Select materials for building structures
 12.10 State the portion of different openings in building at their appropriate places
 12.11 Draw sketches of different sizes of plots along with location of commercial area
 12.12 State building by laws of different agencies i.e., CDA, LDA
 12.13 State the classes of residential buildings

LIST OF PRACTICALS		HOURS
1.	Printing/Lettering on graph paper i. Block printing in ratio 4:5 & 4:7 ii. Single stroke printing in ratio 4:5 & 4:7 iii. Italic printing; free hand, gothic letters, figures in capital and lower case letters	9
2.	Space distribution of drawing sheet and drawing of title strips and drawing different types of lines.	3
3.	Freehand proportionate sketching & sketching to scale of lines, triangle, quadrilaterals, polygon and circle.	9
4.	Construction of scales useful for civil engineering.	3
5.	Drawing triangles with inscribed and circumscribed circles, hexagons inside and outside circle, cones, and conic sections (ellipse, parabola, and hyperbola).	9
6.	Sketching three views of V-block and different wooden blocks.	6
7.	Completion of missing views when two views are given.	3
8.	Drawing of full sectional front view and outside top view of the hollow concrete block.	3
9.	Drawing of full sectional front view, side view and top view of the prisms, pyramids of different types.	9
10.	Drawing isometric views of a cube having circular hole in its focus and R.C.C. stairs (First three steps).	3

11. Create an oblique drawing of different prisms and pyramids from its given principal views.	6
12. Perspective drawing of slotted block and different wooden blocks from there given principal views.	6
13. Draw partial, symmetrical and auxiliary view when top and front views are given, front and side views are given.	6
14. Draw development of a right and oblique truncated hexagonal prism, cylinder and pyramid.	6
15. Pattern drawing of a funnel from given data.	3
16. Draw the following features; Symbols used in building work including public health and electrical installation.	9
17. X-section of wall with foundation, floor and roof details. (9",13-1/2",20cm,30cm	6
18. Line plan of a single room, two roomed quarter and C-Type (1500 sft plinth area) residence.	6
19. Detailed plan, elevation and section of; a) Single room with verandah. b) C-class residence c) Double storey building.	1 8
20. Foundation/layout plan of ; a) C-type residence. b) A-class residence.(3500 sft)	15
21 Detailed plan of; a) A & C class bathroom showing internal arrangement. b) Kitchen with internal fittings.	18
22 Drawing plan of C type residence showing public health and water su connections.	12
23 Draw layout plan for electrification and circuit diagram for C type residence	1 2
24. Prepare a Submission Drawing of a residential building.	12

DAE civil technology year 1					
0801119	Road engineering materials				
TOTAL CONTACT HOURS:	128	T	P	C	
Theory:	32	1	3	2	
Practical:	96				
AIMS:	Students will be able to:				
	1. Master the technical properties, quality testing methods and testing operation skills of construction materials commonly used in roads, bridges, culverts, tunnels and pipelines. 2. Apply current national or industrial standards, codes and procedures to solve problems related to road, bridge, culvert, tunnel and other engineering materials tests.				
COURSE CONTENTS	Hours				
1. Getting To Know The Course	2				
1.1 Be able to classify and identify building materials;					
1.2 Be able to read technical standards for building materials;					
1.3 BE ABLE TO EXPRESS THE LEARNING TASKS AND REQUIREMENTS OF THE COURSES.					
2 Describing	2				

The Properties Of Building Materials

- 2.1 Be able to detect the density of the material, calculate the porosity and density of the material, and judge whether the material is water-resistant material;
- 2.2 Be able to choose thermal insulation materials;
- 2.3 Be able to calculate the tensile and compressive strength of materials and choose the right materials according to the mechanical properties of engineering;
- 2.4 Be able to take appropriate measures for the durability of materials according to the requirement of engineering.

3 Acceptance Of Cement For Campus Road Project

- 3.1 Be able to

- conduct on-site acceptance of cement;
- 3.2 Be able to carry out sampling inspection of cement;
- 3.3 Be able to determine whether the cement quality is qualified;
- 3.4 Be able to select and use cement reasonably;
- 3.5 Be able to properly store cement.

4 Quality Inspection And Acceptance Of Sand And Stone In A Concrete Mixing Station

4

- 4.1 Be able to conduct on-site acceptance of coarse and fine aggregate;
- 4.2 Be able to sample inspection of coarse and fine aggregate;
- 4.3 Be able to judge whether the quality of coarse and fine aggregate is qualified.

5 Campus Road Concrete

4

**Quality
Inspection
And
Acceptance**

- 5.1 Be able to conduct on-site acceptance of concrete;
- 5.2 Be able to design concrete mix ratio;
- 5.3 Be able to sample inspection of concrete;
- 5.4 Be able to determine whether the quality of concrete is qualified.

**6 Quality
Inspection
And
Acceptance
Of Steel Bar
For Bridge In
Lake Of
Campus**

4

- 6.1 Be able to conduct on-site acceptance of reinforcement ;
- 6.2 Be able to sample and inspect of steel reinforcement ;
- 6.3 Be able to determine whether the quality of steel bar is qualified.

7 Campus 4
Road Base -
Lime

7.1 Be able to judge the quality of lime products according to relevant indicators;

7.2 Be able to select reasonably, use and store the lime products correctly, according to the characteristics and requirements of the project.

8 Campus 4
Manhole
Building -
Mortar

8.1 Be able to judge whether the cements are qualified according to the results of the test report.

8.2 Be able to calculate the mix of masonry mortar;

8.3 Be able to select the type of the masonry according to the characteristics of the project and the environment.

9 Campus Teaching Building Asphalt Pavement Project

4

- 9.1 Petroleum asphalt will be mixed and selected reasonably;
- 9.2 Understand the characteristics, classification and performance of asphalt mixture;
- 9.3 Master the composition, technical properties, composition materials and design methods of asphalt mixture.

Recommended/Reference books:

- 1. Road Building Materials, Jiang Zhiqing People's Communications Publishing House
- 2. "Building materials test instructions" compiled

3. by itself
Various
learning
resources
on the
Internet
(Quality
courses
website)
4. A variety
of library
learning
resources.
5. The
national
standard
informatio
n query:
[http://ww](http://www.gov.cn/fuwu/bzxwx/bzh.htm)
[w.gov.cn/f](http://www.gov.cn/fuwu/bzxwx/bzh.htm)
[uwu/bzxxc](http://www.gov.cn/fuwu/bzxwx/bzh.htm)
[x/bzh.htm](http://www.gov.cn/fuwu/bzxwx/bzh.htm)
6. Civil
Engineerin
g network
[http://ww](http://www.civilcn.com)
[w.civilcn.c](http://www.civilcn.com)
[om](http://www.civilcn.com)
7. China
Bridge
Network:
[http://ww](http://www.cnbridge.cn/)
[w.cnbridge](http://www.cnbridge.cn/)
[.cn/](http://www.cnbridge.cn/)
8. Chinese
network:
[http://ww](http://www.chinahighway.com/)
[w.chinahig](http://www.chinahighway.com/)
[hway.com/](http://www.chinahighway.com/)

INSTRUCTION
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1. Master the technical performance and test methods of cement, aggregate, cement concrete and steel
2. Knowledge of technical standards for cement, aggregate, cement concrete and steel
3. Master the mix design of ordinary concrete
4. Grasp the definition of rock, and understand the classification of rock and mineral composition
5. Be familiar with technical requirements of rock and its application in engineering
6. Master the composition material

- and
technical
performan
ce of
mortar
7. Grasp the
concept of
soil, soil
three-
phase
compositio
n, physical
property
indicators
8. Master the
consistenc
y and
index of
clay,
compactio
n and
compactio
n law
9. Grasp the
concept,
classificati
on,
physical
property
index,
mechanica
l property
index and
hydraulic
property
index of
geosynthes
ics
10. Understan
d
production
, digestion,
hardening,
technical
properties,
technical
standards
and
applicatio
ns of lime

11. Master the basic concepts and technical properties of semi-rigid base material and flexible base material
12. Understand the classification and composition of petroleum bitumen; Understand the properties, technical standards and applications of emulsified asphalt and modified asphalt
13. Master the basic technical properties, technical standards and testing methods of petroleum asphalt; Master the quality requirements and test

- methods
of
aggregate
used for
asphalt
pavement;
14. Understand the characteristics, classification and performance of asphalt mixture
15. Master the composition, technical properties, composition materials and design methods of asphalt mixture
16. Master the technical requirements of cement pavement raw materials
17. Be able to correctly describe the technical properties and requirements of common road and bridge engineering materials;

18. Carry out the test operation of the common materials of road and bridge engineering;
19. Be common cement concrete mix design;
20. The composition design of inorganic binder stabilized soil will be carried out.
21. carry out the asphalt mixture mix design;
22. Be able to complete test reports according to current specifications, standards and procedures

LIST	OF	PRACTICALS	hours
1.	Be	familiar with design tasks	12 14 14 14 14

2.	Screening test for coarse aggregate and aggregate mixture (water washing method)	14
3.	Fine aggregate screening test (water washing)	14
4.	Bitumen penetration, elongation, softening point determination	
5.	Preparation of asphalt mixture specimen (compaction method)	
6.	Marshall stability test	
7.	Process experimental data and write test reports	

DAE civil technology year 1					
0801539	Building Construction				
TOTAL CONTACT HOURS:	32	T	P	C	
Theory:	32	1	0	1	

Practical: 0

GOAL: Students will be able to:

1. Have the preliminary ability to be engaged in small and medium-sized architectural scheme design
2. Preliminary ability in construction drawing design

COURSE CONTENTS	Hours
1. The Introduc tion	4
1.1 Basic building elements:	
1.2 Classification of buildings:	
1.3 Building classification:	
1.4 Contents and procedures of architectural design:	
1.5 Requirements and basis of architectural design:	
Building module coordination and component size.	
2 Civil Architecture Design	6
2.1 Overview of Civil Architecture Design:	
2.2 Civil Building graphic Design:	
2.3 Civil building section design:	
1.1. Civil building shape and facade design	
3 Civil Construction	6

- 3.1 Concept of foundation and basement, structural form:
- 3.2 Wall classification, load-bearing scheme, group system
- 3.3 Structural requirements and classification of floors and strata:
- 3.4 Composition, type, scale and related design requirements of stairs:
- 3.5 Roof composition, structural requirements and types
 - Doors and Windows, deformation joint structure and related details of the structure
- 4 Industrial System Of Civil Building**

6

- 4.1 The significance and approach of industrialization of civil architecture:
- 4.2 Block building, plate assembly type building;
- 4.3 Frame light

plate building,
large
formwork
building,
sliding
formwork
building:
Slab building, box
building.

5 Overview Of Industrial Building Structure

6

5.1 Characteristics
and
classification
of industrial
buildings:

5.2 Structural
system of
single-storey
industrial
plant:

5.3 Lifting and
transportation
equipment of
the plant:

5.4 Plane section
features of
single-storey
workshop:

Calibration of
positioning axis.

6 Industrial Construction

4

6.1 Wall structure
of single-
storey
workshop;

6.2 Roof structure
of single-
storey
workshop:

6.3 Structure of
side window
and gate of
single-storey
workshop:

6.4 Skylight

structure of
single-storey
workshop:
Single-storey
workshop floor
and other
facilities.

Recommended/R
eference
books:

1. Building
Construct
ion (2nd
Edition),
Zhuo
Wei,
Nanjing
Universit
y Press,
2019

INSTRUCTION
AL
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ES

1. Master the
structural
composition of
civil buildings
and their
respective
functions;
2. Master the
significance and
division
principles of
building modular
coordination
standards;
3. Master the
division method
of positioning

axis and
understand the
principle and
significance of
positioning axis
numbering.

Understand the
structural
composition of
civil buildings

5. Master the
basic concepts of
foundation,
foundation and
foundation burial
depth:

Master the
classification of
common
foundations and
understand the
general structure
of foundations

7. Master the role,
classification,
structural
requirements and
load-bearing
scheme of the
wall:

8. Be familiar
with common
details of
structure and
application in
practical
engineering;

9 fresh wall
decoration types,
roles, common
wall decoration
structure:

10. Master the
general
knowledge of
basement and the
common structure
of moisture-proof
layer and water-
proof layer.

11. Master the function, type and design requirements of the wall

12 Master the type, composition and structural characteristics of common floor slabs, applicable scope:

13. Master the composition and requirements of the floor, common ground structure and use characteristics;

14. Master the functions and requirements of stairs and understand the plane form of stairs:

15 Master the composition of several parts of the staircase scale requirements:

Understand the types, functions and requirements of roofs of civil buildings;

17 Understand the functions, types and structural requirements of doors and Windows:

18 Understand the concept of building deformation

joints, Be familiar with the types, functions, setting principles and the

width of all kinds
of deformation
joints:

19.Master the
structure of
common
industrial
buildings

20.Master the
characteristics
and classification
of industrial
buildings

DAE CIVIL TECHNOLOGY

YEAR 1

Comp-111

Computer Applications

TOTAL CONTACT HOURS:	96	T	P	C
Theory:	0	0	3	1
Practical:	96			

AIM: This subject will enable the student to be familiar with the operation of a computer and its applications. Basic skills on Windows, Word processing, MS Excel, will be practiced for its applications in civil engineering

Recommended / Reference Books:

- a.i.1. Computer Applications for Beginners.
2. Word Processor Latest Release
3. MS Excel for Learners
4. AutoCAD 2012 for Engineers and Designers by Prof. Shan Tickoo & Gaurav Verma

List Of Practicals

Hours

a.i.1. **Introduction to Computer**

6 HOURS

- 1.1 Demonstrate & practice identification/application of Input/ Output devices
- 1.2 Demonstrate & practice identification/application of Hardwares/ Softwares & their types
- 1.3 Demonstrate & practice identification/application of Computer Resources

a.i.2. **Windows Operating System & Internet**

12 Hours

- 2.1 Practice start, restart, shut down, log on/off
- 2.2 Demonstration & Practice Windows interface
- 2.3 Demonstration & Practice Windows Help
- 2.4 Practice File / folder Manipulation
- 2.5 Demonstration & Practice window search
- 2.6 Practice Windows Advance setting options.
- 2.7 Demonstration & Practice Partitioning & installation of windows
- 2.8 Demonstration Introduction to internet
- 2.9 Demonstration & Practice setting up internet connection using internet browser
- 2.10 Practice Make/Maintain E-Mail address

- 2.11 Practice send/Receive E-Mail
- 2.12 Practice Downloading data
- 2.13 Practice search teaching & learning Resources (TLRs)

a.i.3. **Word Processing**

24 Hours

- 3.1 Demonstration & Practice installation of MS-office package
- 3.2 Demonstration Introduction to word processor
- 3.3 Introduction to MS-Word
- 3.4 Demonstration Main Interface window
- 3.5 Practice open/Close MS-Word
- 3.6 Practice Create/save/Rename/Close files
- 3.7 Practice Editing data in MS-Word
- 3.8 Demonstration and Practice use of clip board
- 3.9 Practice Insert Symbols
- 3.10 Demonstration & Practice find/replace data
- 3.11 Practice Formatting character
- 3.12 Practice Formatting Paragraph
- 3.13 Practice paragraph indentation
- 3.14 Practice Bullets & Numbering
- 3.15 Demonstration & Practice Inserting columns
- 3.16 Practice page setup
- 3.17 Practice spelling & grammar
- 3.18 Practice Synonyms & Thesaurus
- 3.19 Demonstration & Practice Drawing tool bar
- 3.20 Practice word Art
- 3.21 Practice Manipulating Tables
- 3.22 Demonstration & Practice Printing Documents
- 3.23 Demonstration & Practice Mail Merge
- 3.24 Practice using formulas in MS-Word

a.i.4. **MS-Excel**

27 Hours

- 4.1 Introduction to spread sheet program
- 4.2 Introduction to MS-Excel
- 4.3 Practice open/close MS-Excel
- 4.4 Introduction to data types, work sheets/work books
- 4.5 Introduction Row, Column, Cell
- 4.6 Practice Editing Data
- 4.7 Practice data manipulation
- 4.8 Practice Formatting cells
- 4.9 Practice printing documents
- 4.10 Practice using Formula
- 4.11 Practice insert function/wizard
- 4.12 Formula application for surveying data calculation
- 4.13 Formula application for geometry calculation
- 4.14 Formula application for trigonometry calculation
- 4.15 Practice prepare charts
- 4.16 Practice protection of files
- 4.17 Practice data sorting

- 4.18 Practice filtering data
- 4.19 Practice table Manipulation
- 4.20 Practice creating macro
- 4.21 Practice find/replace data
- 4.22 Practice merge/split cells

a.i.5. **AutoCAD**

27 Hours

- 5.1 Installation of Auto CAD Software
- 5.2 Introduction to AutoCAD and demonstration of its use
- 5.3 Demonstration & Practice of AutoCAD Menus
- 5.4 Demonstration & Practice of AutoCAD Graphic window
- 5.5 Demonstration & Practice of coordinate system (Types of coordinates).
- 5.6 Practice setting of model and its layout.
- 5.7 Practice of Draw commands
- 5.8 Practice of File commands
- 5.9 Practice of Edit commands
- 5.10 Practice of dimensions.
- 5.11 Practice of display command.
- 5.12 Modify Commands
- 5.13 Insert object
- 5.14 Formatting Commands
- 5.15 Practice to use existing templates and also create relevant templates.
- 5.16 Practice of drawing of plane and solid geometrical figures
- 5.17 Practice for incorporation of data from WORD and Excel.
- 5.18 Practice of drawing of two roomed house (detailed plan, elevation and sections) and steel reinforcement for slabs and setting layouts for plotting.
- 5.19 Plotting of two roomed house.
- 5.20 Practice Integration of AutoCAD & MS Excel.

موضوعات

1. سورۃ المؤمنین ایف تا پندرہ آیات کا مع ترجمہ
2. دس منتخب مصلحت مع ترجمہ و تشریح
3. حضور ﷺ کی بطور سربراہ خاندان بیان کر سکے
4. اسلامی معاشرہ
5. عمومی مقصد: اسلامی معاشرہ کی خصوصیات سے آگاہی حاصل کر سکے، کے اوصاف کیا ہیں
6. خصوصی مقاصد:
7. اسلامی معاشرہ کا معنی و مفہوم بیان کر سکے
8. اسلامی معاشرہ کی امتیازی خصوصیات بیان کر سکے
9. اسلامی معاشرہ میں عدل و احسان کی اہمیت بیان کر سکے
10. تبلیغ کے لغوی معنی بیان کر سکے
11. تبلیغ کی اہمیت و ضرورت بیان کر سکے
12. جہلوں کے لغوی و اصطلاحی معنی بیان کر سکے
13. جہلوں کی اہمیت بیان کر سکے
14. جہلوں اور فتنوں میں فرق بیان کر سکے
15. جہلوں کی مختلف اقسام بیان کر سکے
16. اقطار مسجد کی تعریف کر سکے
17. مسجد کی سابقہ حیثیت کو بحال کرنے کے بارے میں اقدامات کو بیان کر سکے
18. اسلامی ریاست
19. عمومی مقاصد: اسلامی ریاست کی خصوصیات بیان کر سکے
20. خصوصی مقاصد:
21. ریاست کی تعریف بیان کر سکے
22. اسلامی ریاست میں طرز حکومت سے آگاہی حاصل کر سکے
23. اسلامی ریاست کی خصوصیات بیان کر سکے
24. اسلامی ریاست کے اغراض و مقاصد بیان کر سکے
25. اسلامی ریاست کے قیام کیلئے حدود و حدود کر سکے

نصاب مطالعہ پاکستان

نی بی سی
۱ ۵ ۱
کل وقت: ۱۰ گھنٹے

سال دوم

حصہ دوم

موضوعات

۱۰	۱۰ قومی نظریہ
۱۱	تحریک پاکستان
۱۲	انجین کانگریس
۱۳	مسلم لیگ
۱۴	تقسیم بنگال
۱۵	بیناق کمیٹی
۱۶	تحریک خلافت
۱۷	سندھ تحریک
۱۸	تیلوین راجی
۱۹	مسو رپورٹ
۲۰	قائمہ اعظم کے چودہ نکات
۲۱	خطبہ آل انڈیا
۲۲	انتخابات 1938 اور اسٹیل میزبان
۲۳	قرارداد پاکستان

حصہ دوم
سفرِ پاکستان

تقریریں مقاصد

تحریک پاکستان

عمومی مقصد: قیام پاکستان کے سبب و محرکات کو بیان کر کے
خصوصی مقاصد:

- ☆ قومیت کے مفہوم کو بیان کر کے
- ☆ دو قومی نظریہ کی تعریف و توضیح کر کے
- ☆ دو قومی نظریہ اہمیت بیان کر کے
- ☆ ہندوستانی مسلمانوں کی عرومیں کو بیان کر کے
- ☆ قومی تشخص کو بھل رکھنے سے لئے مسلمان ہند کی مساوی بیان کر کے
- ☆ آزادی ہند اور قیام پاکستان علامہ اقبال اور قائد اعظم کی مساوی بیان کر کے
- ☆ قیام پاکستان سے مستقبل اسلامی مملکت کے قیام کے لئے مسلم عوام کی کوششوں کو بیان کر کے
- ☆ مسلم لیگ کے قیام پاکستان کے لئے جدوجہد بیان کر کے

(غیر مسلم طلباء کے لئے)

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کل وقت: 20 منٹ

نصاب اخلاقیات

سال دوم

موضوعات

ساحرئی، قدر، لحاظ، سلب، قوم، قوی، سطح، شری، سطح، صنعتی، اربوں کی سطح، ضرورت، درجہ

☆ حقوق و فرائض

☆ قوت و بدعت

☆ قوت ارادی

☆ لگن و جذبہ

☆ وسیع النظری

☆ بے غرضی

☆ منسلکی دوستی

☆ خدائی شعور

☆ پاس آزادی

☆ کمال انجمن

☆ تعمیرات کو قبول کرنا

☆ خود شناسی

نصابِ اخلاقیات

سہ ماہ

تدریس مقاصد

عمومی مقاصد :

طالب علم : اخلاقیات کی اہمیت و ضرورت سے سمجھ ہو سکے اور بیان کر سکے

خصوصی مقاصد : طالب علم اس قتل ہو کہ

موضوعات کا مطلب بیان کر سکے

عملی زندگی سے مثالوں کی نشاندہی کر سکے

اپنی شخصیت اور ماحول پر موضوعات کے معنوی اثرات پیدا کرنے کے طریقے بیان کر سکے

اعلیٰ اخلاقی قداریں سے

نیت برداشت۔ قوت ارادی۔ مکتبہ جذبہ۔ وسیع انکسری۔ بے غرض۔ انسانی دوستی خالص۔ شعور۔ پس سزاوی

کمال اکائی اور تواضع کی اہمیت بیان کر سکے

اخلاقیات سے متعلق ہر قسم کی خدمت بہر طور پر انجام دے سکے

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سال سوئم
حصہ اول اسلامیات

تدریس مقاصد

- قرآن حکیم
عمومی مقصد: منتخب سورتوں اور آیات کی روشنی میں اسلام کے بنیادی مقاصد اور عبادات جان سکے
خصوصی مقاصد: طالب علم اس قتل ہو جائے گا کہ
سورۃ الفاتحہ: آیت الکرسی۔ سورۃ بقرہ کی آخری آیات از اسن الرسول سے اور سورۃ اخلاق کا ترجمہ و تشریح کریں
طالب علم درج ذیل کا مفہوم بیان کر سکے
☆ رب العالمین صرف اللہ تعالیٰ ہے
☆ اللہ رحم کرنے والا ہے
☆ قیامت کے دن پادشاهی اللہ کی ہوگی
☆ عبادت اور استغاثت کا حقدار صرف اللہ ہے
طالب علم درج ذیل کا مفہوم بیان کر سکے

- ☆ احادیث کی تشریح کر سکے
☆ معاشرتی اور انفرادی زندگی میں احادیث سے راہنمائی حاصل کر سکے

حقوق و فرائض

- ☆ عمومی مقصد: اسلامی معاشرے کا ایک اہم افراد بن سکے
☆ خصوصی مقاصد:
☆ والدین کے حقوق و فرائض بیان کر سکے
☆ بیسیوں کے حقوق بیان کر سکے
☆ اسلام میں حقوق و فرائض کی صورت میں اپنے اندر خدمت خلق کا جذبہ پیدا کریں
☆ اسلامی اقدار

- ☆ عمومی مقصد: طالب علم جان سکے گا کہ تعلیم کا مقصد حسن اخلاق سے متصف ہونا ہے
☆ خصوصی مقاصد

- ☆ اخلاق کے معنی و مفہوم کو بیان کر سکے
☆ اسلام میں حسن اخلاق کی اہمیت بیان کر سکے
☆ قرآن و سنت کی روشنی میں صبر و استقامت کی اہمیت بیان کر سکے
☆ اسلام میں غفور و رحیم کی اہمیت بیان کر سکے
☆ ایقانے عہد کی اہمیت بیان کر سکے
☆ اشیاء کے معنی و مفہوم کو بیان کر سکے
☆ اشیاء اسلامی کی اہمیت بیان کر سکے
☆ اسلام کی اعلیٰ قدر کو اپنے کر مثالی معاشرہ پیدا کر سکے

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کل وقت: 20 گھنٹے

GEN 311

نصاب (سہل سوئم)
مطالعہ پاکستان
حصہ دوم

موضوعات

- ☆ قیام پاکستان
- ☆ باؤنڈری کمیشن
- ☆ ریڈ کلف ایوارڈ
- ☆ تقسیم بنگلہ و گلگت
- ☆ تقسیم پنجاب
- ☆ مسئلہ مہاجرین
- ☆ ریاست کالہاٹی
- ☆ ریاست جموں و کشمیر
- ☆ سری پانی کا تازہ
- ☆ مطالعہ پاکستان (حصہ دوم)
- ☆ قیام پاکستان

تدریس مقاصد

عمومی مقاصد: قیام پاکستان کے بعد درپیش مسائل سے آگاہی حاصل کرے اور بیان کرے۔
خصوصی مقاصد:

- ☆ باؤنڈری کمیشن تشکیل اور اس کے فرائض بیان کر سکے
- ☆ ریڈ کلف اور اس کے ایوارڈ کے بارے میں بیان کر سکے
- ☆ بنگلہ اور گلگت کی تقسیم کی وجوہات بیان کر سکے
- ☆ پنجاب کی تقسیم کی تفصیل بیان کر سکے
- ☆ مہاجرین کی آمد سے جو مسائل پیدا ہوئے انہیں بیان کر سکے
- ☆ ریاستوں کے الحاق کے بارے میں تفصیل بیان کر سکے
- ☆ ریاست جموں کشمیر کے بارے میں بیان کر سکے
- ☆ سری پانی کے تازہ کو بیان کر سکے
- ☆ قرار واد مقاصد کی تفصیلات بیان کر سکے
- ☆ 22 علماء کے متفقہ اسلامی نکتہ بیان کر سکے
- ☆ قیام پاکستان کے بعد نفاذ اسلام کی کوششوں کو بیان کر سکے
- ☆ پاکستان کے محل وقوع اور اس کی جغرافیائی اہمیت بیان کر سکے
- ☆ پاکستان میں قدرتی وسائل (تیل-گیس-کوئلہ) کے بارے میں بیان کر سکے

(غیر مسلم طلباء کے لئے)

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کل وقت: 20

Gen 311

نصاب اخلاقیات

سل سوئم

موضوعات

☆ احساس ذمہ داری

☆ مثبت ذہن

☆ عدل و انصاف

☆ قوی خدمت کا جذبہ

☆ ذکر و نظری پاکیزگی

☆ احترام آدمیت

☆ شائستگی

☆ حضور درگزر

☆ بردباری

☆ خود انحصاری

☆ اثر و نفوذ

☆ جامعیت

☆ اپنی ذات کی معرفت (پذیرا ہر عمر طلباء اساتذہ اہم شخصیات اوارہ)

(غیر مسلم طلباء کے لئے)

نصاب اخلاقیات

سل سوئم

تدریس مقاصد

عمومی مقصد: ملکی ترقی کے لئے اعلیٰ اوصاف کے ساتھ بہتر طور پر ملک و ملت کی خدمت کرنے

خصوصی مقاصد: طالب علم اس قابل ہو گا کہ

☆ موضوعات کا مطلب بیان کر سکے

☆ عملی زندگی سے مثالوں کی نشاندہی کر سکے

☆ موضوعات کی اہمیت بیان کر سکے

☆ اپنی شخصیت اور معاشرے پر موضوعات کے مطابق اثرات پیدا کرنے کے طریقے بیان کر سکے

☆ مثبت ذہن کے ساتھ کام کر سکے

☆ عدل و انصاف سے اوارہ میں، دفتر میں بہتر ماحول پیدا کر سکے

☆ ماحول کو اخلاقی طور پر پاکیزہ بنائے

☆ کارکنوں کی بہتر طور پر دل جوئی کر سکے

☆ کارکردگی میں اضافہ کر سکے

☆ باہمی احترام کی برکت سے استفادہ کر سکے

DAE CIVIL TECHNOLOGY
YEAR 2
Math 212 APPLIED MATHEMATICS -II

Total Contact Hours T

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Theory 64 Hours 2

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Pre-requisite: Must have completed Mathematics I.

AIMS The students will be able to:

1. Solve problems of Calculus and Analytic Geometry.
2. Develop mathematical skill, attitudes and logical perception in the use of mathematical instruments.
3. Apply principles of Differential Calculus to work out rate measures, velocity, acceleration, maxima & minima values
4. Use Principles of Integral Calculus to compute areas & volumes.
5. Acquire proficiency in solving technological problems with mathematical clarity and insight.

COURSE CONTENTS

1. FUNCTIONS & LIMITS.

4 Hours

- 1.1 Constant & Variable Quantities
- 1.2 Functions & their classification
- 1.3 The concept of Limit
- 1.4 Limit of a Function
- 1.5 Fundamental Theorems on Limit
- 1.6 Some important Limits
- 1.7 Problems

2. DIFFERENTIATION

4 Hours

- 2.1 Increments
- 2.2 Differential Coefficient or Derivative
- 2.3 Differentiation ab-initio or by first

Principle

2.4 Geometrical Interpretation of Differential Coefficient

- 2.5 Differential Coefficient of X^n , $(ax + b)^n$
- 2.6 Three important rules
- 2.7 Problems

3. DIFFERENTIATION OF ALGEBRAIC FUNCTIONS 4 Hours

- 3.1 Explicit Functions
- 3.2 Implicit Functions
- 3.3 Parametric forms
- 3.4 Problems

4. DIFFERENTIATION OF TRIGONOMETRIC FUNCTIONS 6 Hours

- 4.1 Differential Coefficient of $\sin x$, $\cos x$, $\tan x$ from first principle.
- 4.2 Differential Coefficient of $\operatorname{cosec} x$, $\sec x$, $\cot x$
- 4.3 Differentiation of inverse Trigonometric functions.
- 4.4 Problems.

5. DIFFERENTIATIONS OF LOGARITHMIC & EXPONENTIAL FUNCTIONS 4 Hours

- 5.1 Differentiation of $\ln x$
- 5.2 Differentiation of $\log a^x$
- 5.3 Differentiation of a^x
- 5.4 Differentiation of e^x
- 5.5 Problems

6. RATE OF CHANGE OF VARIABLES. 4 Hours

- 6.1 Increasing and decreasing functions
- 6.2 Maxima and Minima values
- 6.3 Criteria for maximum & minimum values
- 6.4 Methods of finding maxima & minima
- 6.5 Problems

7. INTEGRATION 8 Hours

- 7.1 Concept
- 7.2 Fundamental Formulas
- 7.3 Important Rules
- 7.4 Problems

8. METHODS OF INTEGRATION 6 Hours

- 8.1 Integration by substitution
- 8.2 Integration by parts

8.3 Problems

9. DEFINITE INTEGRALS

6 Hours

- 9.1 Properties
- 9.2 Application to area
- 9.3 Problems

10. PLANE ANALYTIC GEOMETRY & STRAIGHT LINE

6 Hours

- 10.1 Coordinate System
- 10.2 Distance Formula
- 10.3 The Ratio Formula
- 10.4 Inclination and slope of a line
- 10.5 The slope Formula
- 10.6 Problems

11. EQUATIONS OF STRAIGHT LINE

6 Hours

- 11.1 Some important Forms
- 11.2 General Form
- 11.3 Angle Formula
- 11.4 Parallelism & Perpendicularity
- 11.5 Problems

12. THE EQUATIONS OF CIRCLE

6 Hours

- 12.1 Standard form of Equation
- 12.2 Central form of Equation
- 12.3 General form of Equation
- 12.4 Radius & Coordinates of the centre
- 12.5 Problems

REFERENCE BOOKS

Applied Mathematics Math-212, by Sana-ullah Khan, Syed Tanvir Haider, Zaif-ullah Khan Vol - I, National Book Foundation

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Must have completed Mathematics I.

students will be able to:

Solve problems of Calculus and Analytic Geometry.

Develop mathematical skill, attitudes and logical perception in the use of mathematical instruments.

Apply principles of Differential Calculus to work out rate measures, velocity, acceleration, maxima & minima values

Use Principles of Integral Calculus to compute areas & volumes.

Acquire proficiency in solving technological problems with mathematical clarity and insight.

CONTENTS

FUNCTIONS & LIMITS.

4 Hours

Constant & Variable Quantities

Functions & their classification

The concept of Limit

Limit of a Function

Fundamental Theorems on Limit

Some important Limits

DIFFERENTIATION

4 Hours

Differential Coefficient or Derivative

Differentiation ab-initio or by first Principle

Geometrical Interpretation of Differential Coefficient

Differential Coefficient of X^n , $(ax + b)^n$
Three important rules

DIFFERENTIATION OF ALGEBRAIC FUNCTIONS 4 Hours

Explicit Functions
Implicit Functions
Parametric forms

DIFFERENTIATION OF TRIGONOMETRIC FUNCTIONS 6 Hours

Differential Coefficient of $\sin x$, $\cos x$, $\tan x$ from first principle.
4.2 Differential Coefficient of $\operatorname{cosec} x$, $\sec x$, $\cot x$
Differentiation of inverse Trigonometric functions.

DIFFERENTIATIONS OF LOGARITHMIC & EXPONENTIAL FUNCTIONS

Differentiation of $\ln x$
Differentiation of $\log a^x$
Differentiation of a^x
Differentiation of e^x

RATE OF CHANGE OF VARIABLES.

4 Hours

Increasing and decreasing functions
Maxima and Minima values
Criteria for maximum & minimum values
Methods of finding maxima & minima

INTEGRATION

8 Hours

Fundamental Formulas
Important Rules

METHODS OF INTEGRATION

6 Hours

Integration by substitution
Integration by parts

FINITE INTEGRALS

6 Hours

Application to area

PLANE ANALYTIC GEOMETRY & STRAIGHT LINE 6 Hours

Coordinate System
Distance Formula
Section Ratio Formula
Inclination and slope of a line

e slope Formula

EQUATIONS OF STRAIGHT LINE

6 Hours

Some important Forms

Angle Formula

Parallelism & Perpendicularity

EQUATIONS OF CIRCLE

6 Hours

Standard form of Equation

Central form of Equation

General form of Equation

Radius & Coordinates of the centre

REFERENCE BOOKS

Mathematics Math-212, by Sana-ullah Khan, Syed Tanvir Haider, Zaif-ullah Khan
National Book Foundation

APPLIED MATHEMATICS -II

ADDITIONAL OBJECTIVES

UNDERSTAND THE CONCEPT OF FUNCTIONS AND THEIR LIMITS IN SOLVING SIMPLE PROBLEMS.

- Define a function.
- List all type of functions.
- Explain the concept of limit and limit of a function.
- Explain fundamental theorems on limits.
- Derive some important limits.
- solve problems on limits.

UNDERSTAND THE CONCEPT OF DIFFERENTIAL COEFFICIENT

- Derive mathematical expression for a differential coefficient.
- Explain geometrical interpretation of differential coefficient.
- Differentiate a constant, a constant associated with a variable and the sum of finite number of functions.
- Solve related problems.

UNDERSTAND THE RULES OF DIFFERENTIATION TO SOLVE PROBLEMS OF ALGEBRAIC FUNCTIONS.

- Differentiate ab-initio x^n and $(ax+b)^n$.
- Derive product, quotient and chain rules.
- Find derivatives of implicit functions and explicit functions.
- Differentiate parametric forms, functions w.r.t another function and by rationalization.
- Solve problems using these formulas.

UNDERSTAND THE RULES OF DIFFERENTIATION TO SOLVE PROBLEMS INVOLVING TRIGONOMETRIC FUNCTIONS.

- Differentiate from first principle $\sin x, \cos x, \tan x$.
- Derive formula Derivatives of $\sec x, \csc x, \cot x$.
- Find differential coefficients of inverse trigonometric functions

UNDERSTAND THE RULES OF DIFFERENTIATION TO LOGARITHMIC AND EXPONENTIAL FUNCTIONS.

- Derive formulas for differential coefficient of Logarithmic and exponential functions.
- Solve problems using these formulas.

UNDERSTAND RATE OF CHANGE OF ONE VARIABLE WITH RESPECT TO ANOTHER.

- Derive formula for velocity, acceleration and slope of a line.
- Define an increasing and a decreasing function, maxima and minima values, point of inflexion.

Explain criteria for maxima and minima values of a function.
Solve problems involving rate of change of variables.

APPLY CONCEPT OF INTEGRATION IN SOLVING RELEVANT

Explain the concept of integration.
State basic theorems of integration.
List some important rules of integration.
Derive fundamental formulas of integration.
Solve problems of integration based on these rules/formulas.

UNDERSTAND DIFFERENT METHODS OF INTEGRATION

List standard formulas of Integration.
Integrate a function by substitution method.
Find integrals by the method of integration by parts.
Solve problems using these methods.

UNDERSTAND METHODS OF SOLVING DEFINITE INTEGRALS.

Define definite integral.
List properties of definite integrals.
Find areas under the curves using definite integrals.
Solve problems of definite integrals.

UNDERSTAND THE CONCEPT OF PLANE ANALYTIC GEOMETRY.

Explain the rectangular coordinate system.
Locate points in different quadrants.
Derive distance formula.
Prove section formulas.
Derive Slope Formula
Solve problem using these formulas.

USE EQUATIONS OF STRAIGHT LINE IN SOLVING PROBLEMS.

Define a straight line.
Write general form of equation of a straight line.
Derive slope intercept and intercept forms of equations of a straight line.
Derive expression for angle between two straight lines.
Derive conditions of perpendicularity and parallelism of two straight lines.
Solve problems involving these equations/formulas.

USE TECHNOLOGICAL PROBLEMS USING EQUATIONS OF CIRCLE.

Define a circle.
Describe standard, central and general forms of the equation of a circle.
Convert general form to the central form of equation of a circle.
Derive formula for the radius and the coordinates of the center of a circle from the general form.
Derive equation of the circle passing through three given points.
Solve problems involving these equations.

Understanding China

Understanding China is a compulsory course designed for international students who study on a Chinese education programme. This course is jointly developed by experts and scholars from a dozen top Chinese universities, providing international students with a more comfortable way for learning about China. It displays China in a panoramic way and reflect “Chinese thought”, “Chinese culture”, and the great achievement in contemporary China’s economic and

CONTENTS

Geography of China 6

Viewing China from the World
 Natural Environment
 Mountains and Rivers I
 Mountains and Rivers II
 Chinese Cities——Beijing
 Chinese Cities——Shanghai
 Chinese Cities——Hong Kong
 Travel Journey——Wuyue, Zhangjiajie, Jiuzhaigou
 Travel Journey——Xizang
 Travel Journey——Xinjiang

6 hours

Predecessors of Chinese People
 Qin Shihuang

Han Silk Road
 Tang Dynasty and Age of Prosperity
 Drinking the River at Qingming Festival
 Genghis Khan and Kublai Khan

Prosperity of the Kangxi and Qianlong period

Sun Yat-sen and Kuomintang
 Communist Party of China
 December 18th Incident
 Mao Zedong and the Establishment of New China
 Leadership of New China
 Deng Xiaoping and China’s Reform and Opening

Philosophy 6 hours

Thoughts in Confucianism-Confucius
 Thoughts in Confucianism-Mencius
 The Teachings of Confucianism-Rites (Li)
 The Teachings of Confucianism-Benevolence (Ren) and Benevolent Rule (Ren Zheng)
 The Teachings of Confucianism-Dao, Li and the Investigation of Things for the Extension of
 Taoism, Yin & Yang and the Five Elements

Schools of Thought-Militarists

Schools of Thought-Legalism		
		2 hours
Beliefs and Religions in China		
Introduction of Buddhism into China		
Major Doctrines, Chan (Zen) School of Buddhism, and Buddhist Attractions.		
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Political System		2 hours
National Flag, National Emblem and National Anthem		
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National Institutions II		
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Political Parties II		
Foreign Policy of the People's Republic of China		
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Major Phases and Genres of China's Literature		
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Chinese Literature--Tang Poetry		
Chinese Literature--Song Poetry		
Chinese Literature--The Four Classical Novels		
Modern and Contemporary Literature I		
Modern and Contemporary Literature II		
Traditional Chinese Musical Concepts		
Traditional Chinese Musical Instruments and Classic Works		
Modern Music		
Chinese Language and the Chinese Characters		2 hours
Phonetic and Dialects		
Traditional Chinese and Modern Chinese		
Interesting Origins of the Chinese Characters&The Development of the Chinese Characters		
Categories of Chinese Characters		
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Calligraphy and Painting		6 hours
What is Calligraphy?		
Evolution of Chinese Calligraphy-The oracle bone inscriptions and the bronze inscription.		
Evolution of Chinese Calligraphy-The small seal and The clerical script		
Evolution of Chinese Calligraphy-The regular script		
Evolution of Chinese Calligraphy-The cursive script		
Evolution of Chinese Calligraphy-The running script		
Importance of calligraphy		
Calligraphy treasures of the study		
Connection between calligraphy and other arts		
General knowledge of Chinese Painting		
Features of Chinese Painting		
Major themes of Chinese Painting and the Representative Works		
Modern Economics		2 hours
The Tertiary Industry		
Development Normal of China's Economy		

igital Economy 2.0	
t and Road Initiative	
and Technology	4 hours
eat Inventions	
igh-speed Railway	
's Ocean Explorations	
ay – Taihu Light” Supercomputer	
ce Science and Technology	
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Universities and Colleges	
Examinations	
International Education	
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Healthcare System	
nal Chinese medicine	
velopment of Traditional Chinese Medicine	
e Concepts in Traditional Chinese Medicine	
cture and Massage	
nal Chinese Medicine and Life I	
nal Chinese Medicine and Life II	
g Chinese Medicinal	
stique of Chinese Medicinal Treatment	
nal Chinese Medicine in the World	
nd Wushu	2 hours
nal Chinese Sports-Kite	
h of the descendants shooting the sun	
Women and the Olympics	
Arts Elements and Martial Arts Spirit in Wushu film	
tural Connotation of Chinese Martial Arts	
nal Festivals and Chinese Cuisine	2 hours
Traditional Festivals	
Traditional Festivals-The Spring Festival&The Lantern Festival	
Traditional Festivals-The Dragon Boat Festivall&The Mid-Autumn Festival	
l cultural heritage	6 hours
Civilization: The Peking Man	
s: Dunhuang Mogao Grottoes	
g Engineering: Dujiangyan	
erial Tombs: Ming Xiaoling and the Ming Tombs	
gest Ritual Bronzes: The Houmuwu Ding	
Instruments from the Warring States Period: The Zenghouyi Bells	
Ancient Architecture	
f Ancient Chinese Architecture	
rchitecture: The Former Imperial Palace in Beijing	
Dwellings: Siheyuan	

Ancient Gardens

le Cultural Heritage

6 hours

Intangible Cultural Heritage

le cultural heritage project-Epic of King Gesar

le cultural heritage project-Guqin

le cultural heritage project-Farmers'dance of China's Korean ethnic group

le cultural heritage project-shadow puppetry

le cultural heritage project-Yueju opera

le cultural heritage project-Seal engraving

le cultural heritage project-Nanjing Yunjin

le cultural heritage project-The 24 solar terms

le cultural heritage project-Crosstalk

le cultural heritage project-Acrobatic art

es China protect ICH?

ended book

g China(Digital and Paper format), edited by Cheng Aimin, jointly developed by Peking

Beijing Normal University、 Zhejiang University、 Tianjin University、

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Studies University 、 Dalian Medical University 、 South China Normal

Jiangsu Normal University and Tang International Education Group, published by Shanghai

guage Education Press, recommended by China Association for International Education

0801919 CHINESE COURSE II

Total contact hours

Theory	64	T	P	C
Practical	0	2	0	2

AIMS There are 20 lessons (including 4-unit reviews) in this course. It is recommended to complete 8 lessons and the unit reviews in 32 class hours. After completing this course, students can master the advanced-basic Chinese language knowledge in the content of the course, and be able to reach and exceed **HSK level THREE**.

INSTRUCTION OBJECTIVE Through this course, learners can systematically learn the language knowledge at this stage and cope with general communication, and can communicate on familiar topics and meet the basic communication needs of daily life and study, and gradually understand and be familiar with Chinese communication etiquette, cultural customs, etc.

COURSE CONTENTS

1. Lesson 1 Pick up international students at the airport

4 hours

This lesson introduces grammatical knowledge such as "flexible use of interrogative pronouns" and "basic forms of clutch words", which requires students to use sequential words correctly and understand the contextual meaning of some special words.

2. Lesson 2 What would you like to drink

4 hours

This lesson introduces the rhetorical question form "can...?" and the related words "not only... but also...", and learn to express your needs correctly in communication.

3. Lesson 3 I'm kidding you

4 hours

This lesson explains the fixed structures "more and more", "more A, more B", etc., and understands how to praise in Chinese and how to deal with others' praise.

4. Lesson 4 I like winter best

4 hours

Through the description of weather, students can learn the usage of adverbs such as "often" and "always", which express frequency, and compare and describe similar phenomena.

UNIT REVIEW 1 (INCLUDING TESTS)

2 hours

Summarize the contents of Lesson 1-4, review key words and grammar knowledge, and help learners really consolidate their mastery. There are tests designed, which can detect what has been learned before, so as to check for leaks and fill gaps.

5. Lesson 5 I caught a cold

3 hours

This lesson learns the basic usage of "active" sentence, understands the expressions related to illness and medical treatment, and learns the language communication in hospital scenes.

6. Lesson 6 You are really careless

3 hours

Learn and summarize the usage of simple directional complements "V come" and "V leave", and master the basic expression of request and evaluation functions in daily communication.

7. Lesson 7 English black tea is healthy and delicious

4 hours

Understand how to express approximate numbers in Chinese, how to persuade others

and how to express their basic attitude.

8. Lesson 8 I'm not a shopaholic

4 hours

This lesson is related to online shopping. Learn the expression "A is A, that is" and learn how to express your views from different angles.

UNIT REVIEW 2 (INCLUDING TESTS)

2

hours

This section leads students to review the knowledge points they have learned in the past, and conduct mid-term tests to test students' learning effect.

9. Lesson 9 Why did grandparents move

3 hours

This lesson introduces a life event related to "moving house", the expression of learning conditions and the extended meaning of directional complement through events.

10. Lesson 10 Eat hot pot for the first time

4 hours

This lesson introduces the way of having dinner in China through "hot pot" and some basic situations of Chinese restaurants, so as to help learners get a preliminary understanding of Chinese dining customs.

11. Lesson 11 Teacher Wang is going to change the house

4 hours

This lesson is related to "housing" in "food, clothing, housing and transportation". While understanding the story, students can learn language knowledge such as hypothetical relationship and overlapping of disyllabic verbs.

12. Lesson 12 Single Li Wenchao

4 hours

This lesson introduces emotional problems, learn about young people's concepts of marriage and love, and learn how to compare them in Chinese.

UNIT REVIEW 3 (INCLUDING TESTS)

2

hours

Review the previous knowledge, students answer questions through the platform, check the learning situation, and help teachers and students analyze their learning situation.

13. Lesson 13 This is her new home

3 hours

This lesson introduces the living conditions of young people at present, and understands how to describe the living environment, learn the Chinese expression of concepts such as location and existence.

**14. Lesson 14 Allen's weekend
3 hours**

This lesson introduces school life, understand the sentence structure expressing complete negation, and summarize the usage of three auxiliary words "adjective", "adverb" and "should".

**15. Lesson 15 Fall in love with public square dancing
4 hours**

By introducing the living conditions of the elderly in China, students can learn Chinese comparative structure, enumerating relations and various usages of complements.

**16. Lesson 16 Taste English afternoon tea
4 hours**

This lesson introduces grammatical knowledge such as "passive" sentence and "adjective reduplication". Through the study of this lesson, students can understand the dining habits of restaurant ordering and national dishes.

UNIT REVIEW 4 (INCLUDING TESTS)

2 hours

This section is a review test class, leading students to review the knowledge points learned in the past for final tests to test students' learning effect.

Math-212 APPLIED MATHEMATICS -II

INSTRUCTIONAL OBJECTIVES

1. USE THE CONCEPT OF FUNCTIONS AND THEIR LIMITS IN SOLVING SIMPLE PROBLEMS.

- 1.1 Define a function.
- 1.2 List all type of functions.
- 1.3 Explain the concept of limit and limit of a function.
- 1.4 Explain fundamental theorems on limits.
- 1.5 Derive some important limits.
- 1.6 solve problems on limits.

2. UNDERSTAND THE CONCEPT OF DIFFERENTIAL COEFFICIENT

- 2.1 Derive mathematical expression for a differential coefficient.
- 2.2 Explain geometrical interpretation of differential

- coefficient.
- 2.3 Differentiate a constant, a constant associated with a variable and the sum of finite number of functions.
- 2.4 Solve related problems.

3. USE RULES OF DIFFERENTIATION TO SOLVE PROBLEMS OF ALGEBRAIC FUNCTIONS.

- 3.1 Differentiate ab-initio x^n and $(ax+b)^n$.
- 3.2 Derive product, quotient and chain rules.
- 3.3 Find derivatives of implicit functions and explicit functions.
- 3.4 Differentiate parametric forms, functions w.r.t another function and by rationalization.
- 3.5 Solve problems using these formulas.

4. USE RULES OF DIFFERENTIATION TO SOLVE PROBLEMS INVOLVING TRIGONOMETRIC FUNCTIONS.

- 4.1 Differentiate from first principle $\sin x, \cos x, \tan x$.
- 4.2 Derive formula Derivatives of $\sec x, \operatorname{cosec} x, \cot x$.
- 4.3 Find differential coefficients of
inverse
trigonometric
functions

5. USE RULES OF DIFFERENTIATION TO LOGARITHMIC AND EXPONENTIAL FUNCTIONS.

- 5.1 Derive formulas for differential coefficient of Logarithmic and exponential functions.
- 5.2 Solve problems using these formulas.

6. UNDERSTAND RATE OF CHANGE OF ONE VARIABLE WITH

RESPECT TO ANOTHER.

- 6.1 Derive formula for velocity, acceleration and slope of a line.
- 6.2 Define an increasing and a decreasing function, maxima and minima values, point of inflexion.
- 6.3 Explain criteria for maxima and minima values of a function.
- 6.4 Solve problems involving rate of change of variables.

7. APPLY CONCEPT OF INTEGRATION IN SOLVING RELEVANT PROBLEMS.

- 7.1 Explain the concept of integration.
- 7.2 State basic theorems of integration.
- 7.3 List some important rules of integration.
- 7.4 Derive fundamental formulas of integration.
- 7.5 Solve problems of integration based on these rules/formulas.

8. UNDERSTAND DIFFERENT METHODS OF INTEGRATION

- 8.1 List standard formulas of Integration.
- 8.2 Integrate a function by substitution method.
- 8.3 Find integrals by the method of integration by parts.
- 8.4 Solve problems using these methods.

9. UNDERSTAND METHODS OF SOLVING DEFINITE INTEGRALS.

- 9.1 Define definite integral.
- 9.2 List properties of definite integrals.
- 9.3 Find areas under the curves using definite integrals.
- 9.4 Solve problems of definite integrals.

10. UNDERSTAND THE CONCEPT OF PLANE ANALYTIC GEOMETRY.

- 10.1 Explain the rectangular coordinate system.
- 10.2 Locate points in different quadrants.

- 10.3 Derive distance formula.
- 10.4 Prove section formulas.
- 10.5 Derive Slope Formula
- 10.6 Solve problem using these formulas.

11. USE EQUATIONS OF STRAIGHT LINE IN SOLVING PROBLEMS.

- 11.1 Define a straight line.
- 11.2 Write general form of equation of a straight line.
- 11.3 Derive slope intercept and intercept forms of equations of a straight line.
- 11.4 Derive expression for angle between two straight lines.
- 11.5 Derive conditions of perpendicularity and parallelism of two straight lines.
- 11.6 Solve problems involving these equations/formulas.

12. SOLVE TECHNOLOGICAL PROBLEMS USING EQUATIONS OF CIRCLE.

- 12.1 Define a circle.
- 12.2 Describe standard, central and general forms of the equation of a circle.
- 12.3 Convert general form to the central form of equation of a circle.
- 12.4 Derive formula for the radius and the coordinates of the center of a circle from the general form.
- 12.5 Derive equation of the circle passing through three given points.
- 12.6 Solve problems involving these equations.

**DAE CIVIL TECHNOLOGY
YEAR 2**

Civil-203

Public Health Technology

TOTAL CONTACT HOURS	160	T	P	C
Theory:	64	2	3	3
Practical:	96			

AIM: To have a comprehensive understanding of the technology of municipal water processing, water distribution, waste water collection & treatment and sludge & effluent disposal

Introduction of Public Health Technology

- 1. Pipes Used In Plumbing Water And Gas Supply:** 2 Hours
 - 1.1 Types.
 - 1.2 Description of pipes with reference to material e.g. G.I, PVC, PPR CI & A/C PIPES
 - 1.3 Specification of pipes.
- 2. Plumbing Tools** 1 Hour
 - 2.1 Introduction
 - 2.2 Type of Tools
 - 2.3 Hand Tools and Machines
- 3. Plumbing Fixtures** 3 Hours
 - 3.1 Flushing cistern, water closets, urinals.
 - 3.2 Type of Traps and their functions.
 - 3.3 Wash hand basin and bath tub
- 4. Plumbing Fittings:** 3 Hours
 - 4.1 Introduction
 - 4.2 Different type of Fittings, G.I, PPRC & PVC
 - 4.3 Joints methods for different plumbing fittings.
- 5. Faucets, Valves & Specials:** 3 Hours
 - 5.1 Taps and their types.
 - 5.2 Valves and their types.
 - 5.3 Mixer of different types.
 - 5.4 Cocks and their types.
 - 5.5 G.I. Specials

6. Introduction to Water Supply	2 Hours
6.1 General importance of water supply.	
6.2 Need for protected water supply.	
6.3 Development of water supply.	
7. Sources Of Water:	3 Hours
7.1 Surface source, lakes, streams, rivers, rainfall, intensity of rainfall, run off, catchments area, and yield from surface sources.	
7.2 Underground/ subsurface sources, springs, wells-its kinds (i.e. tube well), infiltration galleries	
7.3 Yield from wells-Quantity of underground water, water table, aquifers, cone of depression.	
8. Intakes:	3 Hours
8.1 Introduction	
8.2 Type of Intakes(according to objective, location, material & shape)	
8.3 Factor governing the selection of site for an intake.	
9. Quantity Of Water:	3Hours
9.1 Total quantity of water for a town, per capita demand, factors affecting demand	
9.2 Water requirement for domestic, industrial, fire fighting & commercial purposes.	
9.3 Variation in demand	
10. Quality of Water.	4 Hours
10.1 Pure water (Potable water), Contaminated water..	
10.2 Impurities in water	
10.3 Turbidity	
10.4 Colour	
10.5 Temperature	
10.6 Taste and Odour	
10.7 Suspended Solids	
10.8 Total Dissolved Solids (TDS)	
10.9 Alkalinity	
10.10 Hardness	
10.11 Fluorides	
10.12 Biological Water Quality Parameters (Pathogens)	
10.13 Tests of water (physical chemical tests and biological tests) and PH Value of water / use of "WHO" Standards and guidelines for drinking water	
11. Treatment of Water.	9 Hours
11.1 Sedimentation-purpose of sedimentation, plain sedimentation, Types of settling tanks based on functions and shapes.	
11.2 Coagulation-purpose, use of coagulants and kinds. Method of feeding and mixing.	

11.3 Filtration

- Theory of filtration,
- Construction and operation of slow sand, rapid sand, & pressurized filters.
- comparison between slow sand and rapid sand filters

11.4 Disinfection of Water.

- Necessity and methods of disinfection,
- Chlorination
- Forms of chlorination and
- Test for chlorine.

11.5 Water softening.

- Purposes
- Types of hardness
- Methods of softening.

11.6 Miscellaneous methods of water treatment, aeration, fluoridation, colour, odour and taste removal.

12. Distribution System of Water.

6 Hours

- 12.1 Methods of distribution, gravity, combined and direct pumping.
- 12.2 Methods of supply of water intermittent and continuous.
- 12.3 Methods of layout of pipes, dead end, grid, ring and radial system.
- 12.4 Storage-underground and overhead service reservoirs, necessity and accessories.
- 12.5 Appurtenance in distribution system. Use of sluice valves, air valves, drains valves, fire hydrants, water meter, reflux valve, scour valves.

13. Pumps & pumping.

3 Hours

- 13.1 Introduction to pumps and their necessity.
- 13.2 Kinds of pumps, fundamental principle of pumping.
- 13.3 Selection of site for pump /tube-well and pumping station requirements..

14. Introduction to Sanitary Engineering

3 Hours

- 14.1 Introduction.
- 14.2 Terminology of sanitary Engineering. e.g. refuse, garbage, sludge, sullage, refuse etc.
- 14.3 Types of Sanitation systems-conservancy system, water carriage system & cesspool system and their comparison.
- 14.4 Types of sewerage systems and their suitability

15. Quantity of Sewage & design of sewer

5 Hours

- 15.1 Quantity of discharge in sewer, dry weather flow, Self cleansing velocity.
- 15.2 Variation in quantity of dry weather flow and wet weather flow.
- 15.3 Quantity of storm water flow-run off, its co-efficient, time of concentration.
- 15.4 Impervious factor, hydraulic formula for velocity of flow.
- 15.5 Numerical problems

16. House Drainage

3 Hours

- 16.1 Introduction.
- 16.2 Requirements of house drainage.
- 16.3 Shapes & construction of different type of drains & ducts.
- 16.4 House drains slopes & connection with main sewer.
- 16.5 One & two pipe system of drainage and their comparison.

17. Alignment & Layout of sewer Line

3 Hours

- 17.1 Introduction.
- 17.2 Layout of sewer.
- 17.3 Location of sewer line - longitudinal & X-Section showing sewer lines.
- 17.4 Layout of sewer line gradient fixing, bedding, handling, laying, jointing, testing & back filling.
- 17.5 Testing of sewer line.

18. Sewer Appurtenances

4 Hours

- 18.1 Introduction of sewer appurtenances.
- 18.2 Brief description for different type of sewer appurtenances.
- 18.3 Sewer appurtenances location and their functions.
- 18.4 Construction of:- Man holes, shallow MH ,Deep MH, drop-man hole, inlets, clean out, lamp hole, grease, & oil traps, inverted syphon, trestles & piers.

Recommended / Reference Books:

- 1. Plumbing by: **Babbitt.**
- 2. Fundamental of water supply and sanitary engineering by: **Rangwala S.C.**
- 3. Water supply and sanitary engineering. By: **Kulkarni.**
- 4. A text book of sanitary engineering by: **Deshpande R.S.**
- 5. Public health engineering by: **Sharma.**

Instructional Objectives

1. Understand the Types and Specifications of Pipes.

- 1.1 State the types of pipes.
- 1.2 Compare pipes with reference to materials.
- 1.3 Describe specifications of pipes.

2. Understanding Plumbing Tools

- 2.1 State different type of tools, their uses and precautions.

- 2.2 Hand tools and machine tools
- 2.3 Different plumber tools & machines and their working procedures
- 2.4 Precautions for using of tools

3. Understanding Plumbing Fixtures:

- 3.1 State different fixtures i-e Flushing cistern, water closets, urinals.
- 3.2 Type of Traps and their functions.
- 3.3 Explain different type of wash hand basin and bath tub fittings
- 3.4 Installation methods and precautions

4. Understanding Plumbing Fittings:

- 4.1 State objective of fittings.
- 4.2 Explain different type of Fittings, G.I, PPRC & PVC
- 4.3 Joints methods for different plumbing fittings.
- 4.4 Precautions for jointing the fittings.

5. Understand about Faucets and their use.

- 5.1 Explain taps and their types.
- 5.2 Explain valves and their types.
- 5.3 Explain Mixer and their types
- 5.4 Explain G.I specials and their uses and specifications.
- 5.5 Explain cocks their types and uses.

6. Understand the Importance and Necessity of Water Supply

Explain the importance of water supply.

- 6.2 Explain the development of water supply.
- 6.3 Describe the need of protected water supply

7. Understand the Surface and Underground Sources of Water and their Yields.

- 7.1 Explain surface and sub-surface water sources.
- 7.2 Explain underground/ sub-surface water sources.
- 7.3 Enlist different sources of water & compare their merits and demerits.
- 7.4 Define rain fall intensity, run off, catchments area, and hydraulic gradient yield from surface sources.
- 7.5 Calculate yield from surface source
- 7.6 Describe springs, wells, kinds of well, tube well and infiltration galleries
- 7.7 Explain the construction and function of well, tube well
- 7.8 Define aquifer, static water level, Piezometric head, pumping water, Draw Down, area of influence, well yield and cone of depression
- 7.9 Describe quality of underground water acceptable for human life.
- 7.10 Calculate yield from wells (confined & unconfined)
- 7.11 Explain the need for better quality of water for human life.

8. Understand Intakes and Pipe Laying and Testing

- 8.1 Explain intakes and its types i.e. reservoir intakes, river intakes, lake

intakes and canal intakes.

- 8.2 State the factors governing the selection of site for an intake.
- 8.3 Explain the pipe laying and testing procedure

a.i.9. Understand calculation of Total Quantity of Water for a Town

- 9.1 Explain per capita water consumption & factors affecting demand.
- 9.2 Describe the water requirement for domestic, industrial fire-fighting and commercial purposes.
- 9.3 Describe variation in demand of water.
- 9.4 Calculation of quantity and demand of water.

a.i.10. Understand the Quality & Tests for Quality of Water

- 9.1 Define pure water (potable water) and contaminated water.
- 9.2 Explain impurities in water
- 9.3 Explain the procedure for physical chemical and biological tests of water, PH of water
- 9.4 Explain WHO standards and guidelines for drinking water.

a.i.11. Understand the Methods and Process for Treatment of Water

- 11.1 Sketch the over all layout of water treatment plant indicating different stages
- 11.2 Explain sedimentation & plain sedimentation
- 11.3 State the objects of plain sedimentation
- 11.4 Describe types of settling tanks based on function & shapes
- 11.5 Define coagulation
- 11.6 Describe types, purpose and use of coagulants
- 11.7 State the method of feeding and mixing of coagulations
- 11.8 Explain the process of sedimentation by coagulations
- 11.9 State flocculation and types of Flocculator
- 11.10 Explain the working of baffled and mechanical Flocculator
- 11.11 Explain filtration and types of filters
- 11.12 Describe the construction and operation of slow sand and rapid sand and pressure filters
- 11.13 Compare slow sand and rapid sand filters
- 11.14 Describe the process of filter washing
- 11.15 Explain disinfections & its necessity
- 11.16 State methods of disinfections
- 11.17 Explain chlorination, its forms and points of chlorination & chlorine demand
- 11.18 Describe the test for chlorine
- 11.19 State hardness & its types
- 11.20 Explain methods of softening
- 11.21 Explain aeration, fluoridation, colour, odour, and taste

a.i.12. Understand The Systems of Distribution, its Components and Layouts

- 12.1 Explain gravity and combined & direct pumping system of distribution
- 12.2 Explain intermittent and continuous methods of supply of water

- 12.3 Explain with sketches the different pipe layout methods including dead end system, grid iron system, radial & ring system
- 12.4 State the necessity of underground, overhead and service reservoirs
- 12.5 Draw sketches of rectangular overhead service reservoir showing all accessories
- 12.6 Explain with sketches the functions of various appurtenances in a distribution system

a.i.13. Understand Principle of pumping

Recognize different types of pumps

- 13.2 Explain kinds of pumps and principle of working
- 13.3 Explain Pumping station requirements.
- 13.4 Explain Selection of Pumps.

a.i.14. Understand basic facts about Sanitary Engineering

- 14.1 Define terms; sewage, sanitary sewage, domestic sewage, industrial sewage, storm or rain sewage, sewerage works, sewage treatment and sewage disposal
- 14.2 State types of sewer (sanitary sewer, storm sewer, combined sewer, lateral sewer, house sewer, sub-main sewer, main or trunk sewer, out fall sewer and relief sewer)
- 14.3 Compare systems of sewage disposal (Sanitation systems), conservancy system, water carriage system and cesspool drainage system
- 14.4 State types of sewerage system and their suitability
- 14.5 Compare the sewerage systems with each other

a.i.15. Understand the Discharge calculation of sewage for sewer design.

- 15.1 State quantity of discharge in sewer for dry weathering flow.
- 15.2 State the factors on which dry weather flow depends.
- 15.3 Explain the variation in quantity of dry weather flow.
- 15.4 Define terms: run off co-efficient, time of concentration, rain fall intensity and impervious factor.
- 15.5 State the hydraulic formula for velocity of flow.
- 15.6 Estimate the quantity of storm water flow using empirical formula and rational formula.

a.i.16. Understand the Fundamentals and its Requirements of House Drainage

- 16.1 State the aims of buildings drainage and its requirement
- 16.2 Describe with sketches the shapes and construction of different types of drains
- 16.3 State House drains slopes & connection with main sewer
- 16.4 Compare one and two pipe system of drainage

a.i.17. Understand the Procedure for Laying Out and Alignment of Sewer

- 17.1 Define Alignment & Lay out of sewer
- 17.2 State the shapes and material used for sewers
- 17.3 State suitability factors governing alignment of sewer

- 17.4 Describe the procedure of setting out alignment
 - 17.5 Explain the steps, gradient fixing, bedding, handling, lowering, laying, jointing testing & back filling of sewer
 - 17.6 Explain testing of sewer.
- a.i.18. **Understand the Various Types of Sewer Appurtenances.**
- 23.1 Enlist Sewer Appurtenances.
 - 23.2 Describe the location of Sewer Appurtenances.
 - 23.3 Construction and function of man hole, drop man hole, catch basins, inlets, clean out, lamp hole, flushing tanks, regulators, grease and oil traps, inverted syphon, trestle & pier.

List Of Practicals

Hours

- | | |
|--|----------|
| 1. Layout drawing of training institution's plumbing lab. | 3 |
| 2. Demonstration and sketching of various tools and pipe appurtenances. | |
| 3. Cutting and threading of G.I. Pipes and connections of PPR pipes. | 3 |
| 4. Taking out water connection from main pipe line. | 6 |
| 5. Fitting/replacement of water taps. | 6 |
| 6. Installation of water closet, flushing cistern and pipe. | 3 |
| 7. Installation of urinal with flushing cistern and waste pipe. | 6 |
| 8. Installation of wash hand basin (complete). | 6 |
| 9. Jointing of pipes (cast iron SPPRC, PVC and concrete). | 3 |
| 10. Making model of dead system grid, system, ring system and, radial System with G.I. Pipe. | 6 |
| 11. Repair of single acting reciprocating pumps and replacement of non-return valve. | 6 |
| 12. Demonstration on boring of tube-well/hand pump. | |
| 13. Drawing of intakes for water supply. | 3 |
| 14. Turbidity and hardness test of water, PH (testing) | 3 |
| 15. Drawings of settling tank, slow sand filter rapid sand filter | 3 |
| 16. Flow diagram of water treatment. | 3 |
| 17. General layout of water supply and sanitary fitting in a house and calculation of | 3 |

all fixtures.	3
18. Visit of water treatment plant, and water works.	
19. Drawing sketches of various sewer appurtenances (lamp hole, manhole ,shallow and deep man hole drop man hole inlets, regulator, grease and oil trap, inverted syphon, trestles and piers	6
20. Demonstration for excavation of trenches of a small sewer line with proper grade.	6
21. Visit of Sewage Treatment Plant	3
22. Preparation of hydraulic statement of water supply scheme	3
23. Preparation of hydraulic statement of sewerage scheme	3
	3

DAE civil technology year 2				
0801339	Road engineering surveying			

TOTAL CONTACT HOURS:	128	T	P	C
Theory:	32	1	3	2
Practice:	96			

- GOAL:** Enable students to:
1. Have the skills and relevant theoretical knowledge of road and bridge construction survey;
 2. Be able to undertake the middle line survey, vertical section survey, cross section survey and road, bridge, tunnel construction phase construction lofting survey and other work tasks.

COURSE CONTENTS	Hours
1. Measuring job cognition	4
1.1 The task and function of surveying technology and the determination of ground point position	
1.2 Organization principle, method and content of measurement work	
1.3 The concept, classification and characteristics of error	
1.4 Describe the arithmetic mean value principle	
1.5 Calculate three criteria for measuring accuracy	
2 Height measurement	4
2.1 Ordinary leveling	
Task 1: leveling point and leveling route setting	
2.1.1.1 Elevation concept of ground point, principle of leveling.	
2.1.1.2 The concept of leveling points and the layout of leveling routes.	
2.1.1.3 Height difference closure and calculation.	
Task 2: General leveling implementation	
2.1.2.1 Construction and use of level.	
2.1.2.2 Principle of leveling.	
2.1.2.3 Measuring method of leveling.	
Task 3: processing of ordinary leveling results	
2.1.3.1 Ordinary leveling record form.	
2.1.3.2 Leveling errors and preventive measures.	
2.1.3.3 General leveling check and result calculation.	
Task 4: Level inspection and calibration	
2.1.4.1 Geometric axis relation of level.	
2.1.4.2 Inspection of level.	
2.1.4.3 Calibration of level.	
2.2 Elevation control survey	
Task 1: third and fourth level survey implementation	
2.2.1.1 Elevation control survey concept.	

- 2.2.1.2 Principle of third and fourth grade leveling.
- 2.2.1.3 Third and fourth level survey implementation method.
- Task 2: third and fourth grade leveling results processing
 - 2.2.2.1 Grade iii and IV leveling record form.
 - 2.2.2.2 Grade iii and IV leveling calculation check and error distribution.

3 Plane control survey

3.1 The Angle measurement

Task 1: Understanding and using theodolite

- 3.1.1.1 The construction of theodolite.
- 3.1.1.2 The use of theodolite.

Task 2: Horizontal Angle measurement

- 3.1.2.1 Definition of horizontal Angle, principle of observation.
- 3.1.2.2 Horizontal Angle is measured by measuring back method.
- 3.1.2.3 The full circle method measures the horizontal Angle.

Task 3: Vertical Angle measurement

- 3.1.3.1 Definition of vertical Angle, principle of observation.
- 3.1.3.2 Vertical Angle observation.
- 3.1.3.3 Vertical Angle calculation.

Task 4: Inspection and correction of theodolite

- 3.1.4.1 Theodolite geometric axis relation.
- 3.1.4.2 Inspection of theodolite.
- 3.1.4.3 Correction of theodolite.

3.2 Distance measurement and line orientation

Task 1: Distance measurement

- 3.2.1.1 A tape measure measures the distance.
- 3.2.1.2 Line alignment.
- 3.2.1.3 The steel ruler measures the distance.

Task 2: Straight line orientation

- 3.2.2.1 Azimuth concept.
- 3.2.2.2 The construction and use of the compass.

3.3 Traverse survey

Task 1: layout of wire points

- 3.3.1.1 The representation method of ground point position.
- 3.3.1.2 Control measurement concept, national control network.
- 3.3.1.3 Spot selection, marking and stone burial.
- 3.3.1.4 The arrangement of wires.

Task 2: Wire field survey

- 3.3.2.1 The concept of Angle of transition, Angle measured by theodolite.
- 3.3.2.2 Traverse distance measurement.
- 3.3.2.3 Technical requirements for traverse measurement.

Task 3: Traverse internal calculation

- 3.3.3.1 Coordinate calculation principle, coordinate forward calculation and inverse calculation.
- 3.3.3.2 Calculation and adjustment of Angle closure error.
- 3.3.3.3 Calculation of traverse coordinate azimuth.
- 3.3.3.4 Calculation of coordinate increments.
- 3.3.3.5 Calculation and adjustment of coordinate incremental closure error.

Task 4: Total station traverse measurement

- 3.3.4.1 Construction and use of total station.

- 3.3.4.2 Coordinate measuring principle of total station.
- 3.3.4.3 Coordinate measuring method and data processing of total station.

4 Highway topographic map mapping

4

4.1 Topographic map recognition

Task: topographic map recognition and recognition

- 4.1.1.1 Topographic map scale, topographic map notes.
- 4.1.1.2 Concept and representation method of ground object and landform.
- 4.1.1.3 The concept, type and feature of contour line.

4.2 Topographic map drawing

Task 1: Mapping topographic map with planer

- 4.2.1.1 Planer mapping principle.
- 4.2.1.2 The structure, placement and use of the flat plate instrument.
- 4.2.1.3 Mapping with large flat plate instrument.
- 4.2.1.4 Theodolite surveying.

Task 2: Topographic map inspection, consolidation and repair

- 4.2.2.1 Inspection of topographic maps.
- 4.2.2.2 Mosaic of topographic maps.
- 4.2.2.3 Decoration of topographic maps.

Task 3: Digital Topographic Mapping (0.5 credit hours)

- 4.2.3.1 The concept of digital topographic maps.
- 4.2.3.2 Field sampling method.
- 4.2.3.3 Automatic contour drawing.

4.3 Topographic map application

Task: Basic application of topographic maps (0.5 credit hours)

- 4.3.1.1 Find the coordinates, elevation, distance between two points.
- 4.3.1.2 Determine the azimuth and slope of the line.
- 4.3.1.3 Draw longitudinal section and determine catchment area in a certain direction

5 Highway center line survey

4

5.1 Line selection measurement and mileage pile setting

Task 1: route intersection and turn point test

- 5.1.1.1 The concept of intersection and revolution.
- 5.1.1.2 Paper and field alignment.

Task 2: Determination of Route Corners (0.5 credit hours)

- 5.1.2.1 Concept and calculation of corner Angle.
- 5.1.2.2 The nailing of the midpoint direction of the curve pile.
- 5.1.2.3 Route control pile position is fixed.

Task 3: Setting of mileposts on the route (0.5 credit hours)

- 5.1.3.1 Concept and type of mileage pile.
- 5.1.3.2 Writing and nailing of mileage piles.

5.2 Curve layout

Task 1: Measurement of circular Curves (6 credit hours)

- 5.2.1.1 Calculation of measuring elements of circular curve and mileage calculation of main point.
- 5.2.1.2 Support distance method for detailed measurement.
- 5.2.1.3 Deflection Angle method detailed measurement.
- 5.2.1.4 Polar coordinate method detailed test.

Task 2: Virtual intersection curve measurement

5.2.2.1 The concept of virtual intersection.

5.2.2.2 Out of circle baseline method.

5.2.2.3 Cut baseline method.

5.2.2.4 Chord base line method.

Task 3: Design of relaxation curve

5.2.3.1 The concept and formula of relaxation curve.

5.2.3.2 Main point measurement of flat curve with easement curve.

5.2.3.3 Detailed measurement of flat curves with easement curves.

6 Highway cross section survey

4

6.1 Longitudinal survey

Task 1: Base-level measurement (0.5 credit hours)

6.1.1.1 Line leveling point setting.

6.1.1.2 Base level measurement method.

Task 2: Medium level measurement

6.1.2.1 General method of level measurement.

6.1.2.2 Horizontal measurements across valleys.

6.1.2.3 Total station instrument for medium level measurement.

Task 2: Profile drawing (0.5 credit hours)

6.1.3.1 Longitudinal understanding.

6.1.3.2 The drawing method and principle of longitudinal section map.

6.2 Cross-sectional survey

Task 1: Cross sectional direction determination and measurement

6.2.1.1 Determination of cross section direction.

6.2.1.2 Cross section measurement method.

Task 2: Cross-sectional drawing

6.2.2.1 Understanding of cross section map.

6.2.2.2 Methods and principles for drawing cross-sectional drawings.

7 Highway construction survey

6

7.1 Highway construction lofting task.

7.2 Lofting of known distances.

7.3 Given the lofting of the horizontal Angle.

7.4 Known elevation lofting.

7.5 Lofting of known slope.

7.6 Lofting of known coordinates.

7.7 Total station coordinate lofting

7.8 GPS principle and lofting method

Recommended/Reference books:

1. Civil Engineering Surveying (2nd Ed.), Chen Zhengyao, Higher Education Press, 2021.01
2. Engineering Survey Training Instruction Manual, Liang Yongping, China Railway Publishing House, 2018.02

INSTRUCTIONAL OBJECTIVES

1. Measuring job cognition

- 1.1 Can correctly describe the classification of surveying engineering and the tasks and functions of surveying work in each stage of highway construction;
- 1.2 Can correctly describe the shape and size of the earth, know the geoid and datum line;
- 1.3 Can correctly describe geodetic coordinates, Gaussian plane cartesian coordinates and independent plane cartesian coordinates;
- 1.4 Be able to describe the basic principles, methods and contents of measurement work;
- 1.5 Know the concept of measurement error, arithmetic mean value principle, observed median error, allowable error, relative error;
- 1.6 Accurately state the criteria for evaluating the accuracy of observations.

2. Height measurement

- 2.1 Be able to lay leveling points and leveling routes according to the requirements of engineering survey;
- 2.2 Can use the level to carry out elevation leveling;
- 2.3 Be able to check and calibrate the level;
- 2.4 Able to use level and other instruments for third and fourth level elevation control measurement;
- 2.5 Be able to analyze and calculate leveling results and process data of leveling results;
- 2.6 Be able to analyze the causes of leveling errors and pay attention to their preventive measures.

3. Plane control survey

- 3.1 Be able to arrange wire network and wire point according to the technical requirements of engineering survey;
- 3.2 Can use theodolite for horizontal Angle, vertical Angle;
- 3.3 Capable of theodolite inspection and correction;
- 3.4 Can use a tape measure for ordinary distance, the use of steel ruler for precision distance;
- 3.5 Can use compass to measure magnetic azimuth;
- 3.6 Be able to carry out field operation and internal calculation of traverse survey.
- 3.7 Can use total station for total station plane control network measurement calculation;
- 3.8 Be able to analyze the causes of distance measurement and Angle measurement errors and pay attention to preventive measures.

4. Highway topographic map mapping

- 4.1 Be familiar with the basic knowledge of topographic map;
- 4.2 Can correctly describe the concept of contour line, contour distance and contour flat distance, contour line classification, contour line characteristics;
- 4.3 It can select feature points and geomorphic feature points.
- 4.4 Large scale topographic map mapping can be carried out by using a flat plate

instrument;

- 4.5 Able to depict features, draw contour lines, check, join and decorate topographic maps;
- 4.6 Be familiar with large scale digital mapping;
- 4.7 Ability to identify required elements using topographic maps.

5. Highway center line survey

- 5.1 The location of intersection point and turning point can be determined by laying out the line on the spot.
- 5.2 It can observe and calculate the right Angle of the route, and set up highway mileage piles according to terrain changes and pile distance requirements.
- 5.3 Able to calculate the circle curve measuring elements and the mileage of the main point pile, able to use the tangent distance method, deflection Angle method and coordinate method for the detailed measurement of the circle curve;
- 5.4 The virtual intersection curve can be measured;
- 5.5 To test the relaxation curve;
- 5.6 Capable of measuring complex curves.

6. Highway cross section survey

- 6.1 Measuring method and cross river valley survey which can be carried out with level instrument;
- 6.2 Using total station for medium level measurement;Can draw highway profile map;
- 6.3 Can carry on the cross section direction determination;
- 6.4 Highway cross section measurement by energy method;
- 6.5 Be able to draw highway cross-sectional map.

7. Highway construction survey

- 7.1 Can correctly describe the concept and task of construction survey;
- 7.2 Can carry out known horizontal distance, known horizontal Angle, known elevation, known slope, known coordinates of all kinds of lofting;
- 7.3 Can use total station and GPS for all kinds of lofting operations

LIST OF PRACTICALS		Hours
1.	Measuring job cognition	8
2.	Height measurement	8
3.	Plane control survey	8
4.	Highway topographic map mapping	8
5.	Highway center line survey	8
6.	Highway cross section survey	8
7.	Highway construction survey	8
8.	Simulation of highway construction survey scheme	8
9.	Simulate the control measurement	12
10.	Analog mapping topographic map	8
11.	Simulated highway construction survey	12

0801609	DAE civil technology year 2 Principles of structural design
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TOTAL CONTACT HOURS:	64	T	P	C
Theory:	64	2	0	2
Practical:	0			

GOAL: Students will be able to:

1. Have the preliminary ability to be engaged in small and medium-sized architectural scheme design
2. Preliminary ability in construction drawing design

COURSE CONTENTS	Hours
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COURSE CONTENTS	Hours
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1. Basic part of material properties and design principles	16
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1. Basic part of material properties and design principles	16
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- 1.1 Master the type, grade, performance and selection principle of steel bar used in bridge engineering
- 1.2 Master the strength and deformation performance of concrete under various stress states and the selection principle
- 1.3 Master the basic concept and design calculation principle of structure limit state
- 1.4 Understand how steel and concrete work together
- 1.5 Understand the basic principles of structural reliability theory.

2. The basic part of reinforced concrete member bearing capacity calculation 16

2. The basic part of reinforced concrete member bearing capacity calculation 16

- 2.1 Master the basic structural requirements of reinforced concrete structural components
- 2.2 Master the calculation of the bearing capacity of the normal section of the rectangular section of the reinforced concrete flexural member
- 2.3 Master the bearing capacity calculation of double - bar rectangular section of reinforced concrete flexural member
- 2.4 Master the calculation of the bearing capacity of the normal section of the t-shaped section of the single bar of reinforced concrete flexural members
- 2.5 Master the calculation of the bearing capacity of the inclined section of reinforced concrete flexural members
- 2.6 Master the calculation of reinforced concrete axial compression members and eccentric compression members
- 2.7 Master the bearing capacity calculation of reinforced concrete tensile members
- 2.8 Understand the key points of calculation of torsion reinforced concrete members
- 2.9 Master the deflection calculation and crack width calculation of reinforced concrete members.

3. **Prestressed concrete member bearing capacity calculation foundation part** 163. **Prestressed concrete member bearing capacity calculation foundation part** 16

- 3.1 Understand the stress calculation requirements and methods of prestressed concrete flexural members
- 3.2 To understand the requirements and methods of stress calculation in anchorage zone at the end of prestressed concrete flexural members
- 3.3 Master the principle of prestressed concrete
- 3.4 Grasp the requirements and methods for calculating the crack resistance of normal section and inclined section of prestressed concrete flexural members
- 3.5 Master the deformation calculation of prestressed concrete flexural members

3.6 Master the design and calculation method of prestressed concrete beam

4. Basic part of bearing capacity calculation of masonry structure

16

4.1 Understand the concept and characteristics of masonry structures

4.2 Be familiar with masonry materials

4.3 Master the types and main mechanical properties of masonry

4.4 Master design calculation principles for masonry structures

4.5 Master normal section bearing capacity calculation of masonry bearing members

Recommended/Reference books:

3. Building Construction (2nd Edition), Zhuo Wei, Nanjing University Press, 2019

INSTRUCTIONAL OBJECTIVES

1. Basic part of material properties and design principles

1.1 Capable of load calculation and limit state design

2. The basic part of reinforced concrete member bearing capacity calculation

2.1 Able to calculate reinforced concrete members

3. Prestressed concrete member bearing capacity calculation foundation part

3.1 It can calculate the prestressed concrete beam and slab members

3.2 Master the design and calculation method of prestressed concrete beam

4. Basic part of bearing capacity calculation of masonry structure

4.1 Able to calculate masonry structure design

DAE CIVIL TECHNOLOGY YEAR 2

Civil-223

Advanced
Construction
Techniques

TOTAL HOURS:	CONTACT	160	T	P	C
Theory:		64	2	3	3
Practical:		96			

AIM: To understand the fundamentals of building construction and machinery used for the purpose and also be able to identify the modern methods used in construction

Course Contents

Components of a building and building specifications 4 Hours

- 1.1 Introduction
- 1.2 Construction of a building:
Civil Works
- 1.3 Various steps in construction of a residential building

Site preparation and setting out of works 4 Hours

- 2.1 Introduction
- 2.2 Site layout of Civil Project

- 2.3 Water
Supply
ground
water
control:
permanent
exclusion
of water
- 2.4 Electrical
Supply
- 2.5 Initial
checks on
drawings
- 2.6 Layout /
Setting out
of
buildings
- 2.7 Constructi
on
procedure
of a Multi-
storey
building

Construction of Foundation

4 Hours

- 3.1 Simple
foundation
design
- 3.2 Setting out
for
brickwork
foundation
of Two
room
- 3.3 Foundatio
ns of
framed
buildings
- 3.4 Foundatio
ns for
staircases
- 3.5 Eccentrica

- lly-loaded
foundation
s
- 3.6 Bridge
Foundatio
ns

**Block masonry
and Marble
Work**

4 Hours

Considerations for
use of hollow
concrete blocks
Laying of blocks
Hollow concrete
blocks with
concrete infilling
Special features of
concrete block
masonry
Compound walls
in block work
Tools for stone
and marble work

**Water Proofing /
Termite Proofing
of Structures**

4 Hours

- 5.1 Water
proofing
materials
and
products.
- 5.2 Water
proofing
of struck
(horizontal
/ vertical)
- 5.3 Termite
proofing
- 5.4 Materials
used in

termite
proofing

Flooring

4 Hours

- 6.1 Ground floors
- 6.2 Suspended floors
- 6.3 Laying of toppings
- 6.4 Choice of floor finishes
- 6.5 Use of abrasives in floors
- 6.6 Types of floors

7 False Works

7 Hours

- 7.1 Types of False works.
- 7.2 Types of scaffolding.
- 7.3 Types of shoring.
- 7.4 Methods of underpinning.
- 7.5 Purpose of formwork
- 7.6 Components of formwork wares
- 7.7 Characteristic s of a good form work quality, safety, and economy
- 7.8 Types of formwork collapsible, progressive, slip formwork

and non-removable

7.9 Preparation of formwork for placing concrete-

7.10 Loads on formwork

7.11 Form work for different components of structure

Stairs, Stair Case and lifts / Elevators and Escalators

5 Hours

Important technical terms.

Types of different stairs and staircases with brief specifications and parts

Planning and design of a stair-relation between going and rise, width of stair, length of flight, landing and location of stair etc.

Types of stairs according to material used.

Lifts, elevators, ramps and escalators.

9. Multi-storey

2 Hours

**framed
Structure
Buildings**

- 9.1 The selection of the material.
- 9.2 Types of multi-story frames.
- 9.3 Forms of multi-story construction.
- 9.4 Description of Components of framed structure building.

**Basement
construction**

3 Hours

Purpose of basements.
Box basements.
Water proofing methods.
Construction procedures.

**Fire Protection of
Buildings**

3 Hours

- 11.1 Causes and effects of fire
- 11.2 Fire resisting materials-characteristics, fire-resisting properties of

- construction materials
- 11.3 Arrangements for fire-protection of building-alarm system, protection of openings, stairs and floors, smoke detectors, fire extinguishing arrangement
- 11.4 Fire-resisting construction-classification of building for fire resistance, fire protection of concrete, wooden and steel structures
- 11.5 Means of escape in case of fire basic principles of means of escape means of escape required for flat, office building, and public building.

Air conditioning and ventilation of building

4 Hours

- 12.1 Introduction, definition, conditioned air, purity, humidity cooling, heating, ventilation.
- 12.2 Thermal insulation, transmission of heat, insulating material

- 12.3 Factors affecting ventilation of building, functional requirements of ventilation, methods of ventilation
- 12.4 Heating of building, methods of heating, warm air furnace steam heating, hot water heating system, panel heater, and unit heater.
- 12.5 Cooling of building, methods of cooling, chilling water cooling, ice cooling, spray cooling, mechanical refrigeration (air conditions)
- 12.6 Air conditioning plants, system of air conditioning, air circulation filters.

Acoustics of Buildings

4 Hours

- 13.1 Technical terms: sound, pitch, loudness, intensity of sound, reflection, transmission and absorption of sound, optimum time of reverberation

- 13.2 Factors to be considered in an acoustics of buildings.
- 13.3 Sound absorbing materials-characteristics
- 13.4 Acoustic design of an auditorium
- 13.5 Sound insulation-methods of sound insulation.
- 13.6 Physical measurement of sound
- 13.7 Reverberation of echos
- 13.8 Sound insulation
- 13.9 Common acoustical defects and remedies of conference halls
- 13.10 Use of ray diagram and echo
- 13.11 Design of auditoriums
- 13.12 Requirements of an auditorium
- 13.13 Acoustical materials
- 13.14 Recommendations for different types of buildings for good acoustics

Maintenance of Structures

6 Hours

- 14.1 Introduction
- 14.2 Classification of building maintenance-routine/annual repair, special repairs and

maintenance etc.

- 14.3 Repair to damage surface finishing such as plaster, pointing, white wash, distemper and painting.
- 14.4 Repair to damage parts of floors such as concrete floor, terrazzo floor, mosaic floor, and timber floors.
- 14.5 Exposure of reinforcement spalling causes and repairs.
- 14.6 Protection against leakage through roofs-causes and repairs
- 14.7 Replacement of glass panes, decayed timber, easing of door and windows.
- 14.8 Repair to cracks in masonry wall.
- 14.9 Repair to concrete structures.
- 14.10 Maintenance of sanitary appliances
- 14.11 Maintenance of electrical system
- 14.12 Maintenance of water supply system including taps and fixtures
- 14.13 Maintenance of septic tank
- 14.14 Maintenance of drainage system

- 14.15 Renovation / rehabilitation of old structures and their procedures.

Introduction to Seismic Proof Construction.

4 Hours

- 15.1 Important seismic related Definition & Terms,
- 15.2 Different seismic zones
- 15.3 Seismic Design Parameters
- 15.4 Seismo-resistant building architecture
- 15.5 Ductility considerations in earthquake resistant design of buildings
- 15.6 Construction in different seismic zones
- 15.7 Methods and materials of construction

Municipal Requirements in planning of buildings

2 hours

- 16.1 Introduction
- 16.2 Classification of buildings
- 16.3 Example of building regulations

Recommended / Reference

Books:

- 1 Building Construction
n: **Arora and Gupta.**
- 2 Building Construction
n : **M.Rangwala**
- 3 Construction Technology
Chudly
Volume I, II, III, IV
- 4 Building Construction
n Mackay
Volume I, II, III, IV
- 5 Building Construction
n : **S.K. Sharma**
- 6 Building Construction and Foundation Engineering : **Jah**
- 7 Construction Planning, Equipment and Materials : **R. L. Puri**
- 8 Dampness in Buildings:
Oliver.
- 9 Building Construction
on : **P.C. Varghese**
(Eastern

- Economy
Edition)
- 10 Geotechnic
al
Earthquake
Engineerin
g **S. L.**
Kramer,
[2008],
Pearson
Education
- 11 Earthquake
Resistant
Design of
Structures,
P.
Agarwal
& M.
Shrikhand
e [2009],
PHI, New
Delhi.
- 12 Design of
Steel
Structures:
P.
Dayaratna
m, [2008],
S. Chand
& Co New
Dehli
- 13 Building
Constructi
on: **P. C.**
Varghese
[2009],
PHI
Learning
New Dehli
- 14 Building
Constructio
n:
N.L.Arora
and

- B.R.Gupta**
[2001],
Prakashar,
New Delhi
- 15 Constructio
n
Technology
: **Eric**
Fleming,
[2004],
Blackwell
Publishing
- 16 Steel
Designer's
Manual:
Buick
Davison
and
Graham
Owens,
[2005],
Blackwells
Publishing
- 17 Fundament
als of
Building
Constructio
n :
Edward
Allen,
[1985],
Wiley &
Sons
- 18 Rehabilitati
on and
Reuse of
Old
Buildings:
D. High
field,
[1987], E
& F. N
Spon
- 19 Building

Materials
and
Constructio
n:
Theodore
Marotta,
 [2005],
 Pearson
 Apprentice
 -Hall
 20 Structural
steel
works:
A.B.
Clark &
S. H.
Coverman
 ,[1987],
 Chapman
 & Hall

Instructional Objectives

1. Understand components of building & building

- 1.1 State different components of building
- 1.2 Explain : - Works of a building
- 1.3 Explain various step involved in construed of a residential building

2. Understand site preparation for Civil projects and setting out works.

2.1 Introduce site preparation for project.

2.2 Draw site layout including site activities space allocation for material storage, plant position, working area, accommodation for staff.

2.3 Explain water supply for construction including ground water control, permanent exclusion of ground water, temporary exclusion (well point system, deep bored well).

2.4 Basic nature of electric supplies for equipments & materials used in construction.

2.5 State different

checks drawings
of project.

2.6 Explain
setting out of
buildings.

2.7 Describe
construction
procedure of
multistory
building.

3. Understand Construction precedence of foundations.

3.1 State simple
foundation design.

3.2 Describe
setting out for
brick work of a
load bearing wall.

3.3 State
foundations of
framed buildings.

3.4 Describe
foundation of
staircase.

3.5 Explain
exceptionally
loaded
foundations.

3.6 Explain deep
foundation the
necessity

- Pile
fou
nda
tion
- Cof
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Da
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- Cai
ss
on

fou
nda
tion

4. Understand Principles of Constructing Formwork for Reinforced Concrete Structural Components.

- 4.1 State use of hollow concrete blocks.
- 4.2 Explain laying of blocks
- 4.3 Explain hollow concrete blocks with concrete infilling.
- 4.4 Explain compound walls in block work.
- 4.5 Describe different tools for stone and marble work.
- 4.6 State the stripping of formwork.

5. Understand water proofing/Term

**ite proofing of
structure.**

- 5.1 State water proofing materials and products
- 5.2 Explain water proofing of basement (Vertical & Horizontal)
- 5.3 Describe the procedure of termite proofing of foundation.
- 5.4 State the material use in termite proofing.

**6. Understand
the Principles
and Technique
of Air
Conditioning
and
Ventilation of
a Building.**

- 6.1 State different ground floors with their base& bare layer. .
- 6.2 Explain types of suspended floors.
- 6.3 Describe laying of toppings
- 6.4 State choice of floor

- finishes.
- 6.5 Explain use of abrasives in floors.
- 6.6 Describe the structure of followings
- Conc
 - Stone
 - Cera
 - Mosa
 - Wood

7. Understand the Principles of constructing false works and form works for structural components.

- 7.1 Define false work.
- 7.2 Explain different types of scaffolding s.
- 7.3 Explain different types of shoring.
- 7.4 Explain different Methods of underpinni

- 7.5 ng.
Purpose of formwork
- 7.6 Describe different components of form work sheathing, supporting member braces, form hard wares.
- 7.7 Explain characteristics of a good form work quality, safety and economy.
- 7.8 Describe Collapsible , progressive , slip and non removable form work.
- 7.9 Explain principles of form work for placing of concrete, assembly, cleaning and oiling.
- 7.10 Explain form work for column, colluder base walls slab beams.

8. Understand the Principles involved in planning & design of

**stairs, lifts,
elevators and
escalators.**

- 8.1 Define the terms used.
- 8.2 Describe different types of stairs and staircases with brief specifications and parts.
- 8.3 Explain principles to be observed while planning and design of stair.
- 8.4 State the types of stairs according to material used.
- 8.5 Describe lifts, elevators, ramps and escalators.

**9 Understand
the
Techniques
involved in
the
Construction
of Multi-
storey
framed structure
Buildings**

- 9.1 State the selection of the material for multi-

- storey
framed
buildings.
- 9.2 Describe
different
types of
multi-
storey
frames.
- 9.3 State the
different
forms of
multi-
storey
framed
structure
constructi
on.
- 9.4 State the
different
componen
ts of
multi-
storey
framed
structure
constructi
on.

10 Understand the Principles of Basement construction

- 10.1 State
purpose of
basements.
- 10.2 Describe
box
basements.
- 10.3 Describe
methods
of water
proofing
basements.
- 10.4 Describe
the

constructi
on
procedures
of
basement.

11. Understand the Principles for Fire Protection of Buildings

- 11.1 Discuss the causes and effects of fire
- 11.2 Explain the fire resisting properties of construction materials.
- 11.3 Describe the arrangement for fire protection of building i.e. alarm system, fire extinguishing arrangement.
- 11.4 Explain principles to be observed for fire protections of concrete, wooden and steel structures.
- 11.5 Discuss the means of escape from a building in

case of fire.

**12. Understand
the Principles
and Technique
of Air
Conditioning
and
Ventilation of
a Building.**

- 12.1 Define terms, conditioned air, purity of air, humidity, cooling heating and ventilation.
- 12.2 State the importance of thermal insulation of building.
- 12.3 State the standards for ventilation of building.
- 12.4 Explain the methods of ventilation i.e. natural and mechanical ventilation.
- 12.5 Explain the methods of heating a building.
- 12.6 Explain the methods of cooling building.
- 12.7 State the systems of mechanical air conditioning of building.

- 12.8 State the air distribution and cleaning method.
- 12.9 Explain the working principles of mechanical air conditioning plant/system.
- 12.10 Calculate flow of heat energy through a composite structure.
- 12.11 Calculate heat losses/gains for an enclosure and propose procedures to minimize heat loss/gain.

13. Understand the principles and Techniques of Acoustic Control of a Building.

- 13.1 Define terms, sound, pitch, loudness,

tone,
intensity of
sound,
reflection of
sound,
reverberatio
n, time of
reverberatio
n,
transmissio
n of sound
and
absorption
of sound.

- 13.2 Explain the factors to be considered in acoustics of building.
- 13.3 Describe the characteristics of various types of sound absorbing materials.
- 13.4 Explain principles to be observed in the acoustic design of an auditorium.
- 13.5 Explain the methods of sound insulation of a building.
- 13.6 Describe common acoustical defects and remedies of conference halls
- 13.7 State use of

ray diagram
and echo

**14. Understand
the
Maintenance
Required for
Building**

- 14.1 Explain the annual and special repairs required for building.
- 14.2 Explain the methods of repair of damaged plastered surface, white wash, distemper and painting.
- 14.3 Explain the procedure of repair of various damaged floors such as, concrete floor, terrazzo floor, mosaic and timber floors.
- 14.4 Explain causes of spalling in R.C.C members and protections against it.
- 14.5 Explain causes, method of

- repair for leakage through roofs.
- 14.6 Explain causes and symptoms of cracks in masonry and their repairs.
- 14.7 Explain repair of sanitary system electrical, water supply, septic tank and drainage system.
- 14.8 Explain repair of concrete structures.
- 14.9 Explain renovation/ revalidation of striation

15. Understand the Principles of seismic proof construction

- 15.1 State Reid's elastic theory, theory of plate tectonics, seismic waves, earthquake size local site effects, internal structure of

- earth,
classificatio
n of earth
quartos
sunami
- 15.2 Describe
different
seismic
zones.
- 15.3 Explain
seismic
design
parameters.
- 15.4 Explain
seism
resistant
building
architecture
- 15.5 State
ductility
consideratio
n in
earthquake
resistant
design of
building.
- 15.6 Explain
construction
of project in
different
seismic
zones
- 15.7 Describe
methods
and
materials of
construction
- 15.8 Describe
principles
to be
observed
while
planning,
designing
and
construction
of

earthquake
resisting
buildings.

- 15.9 Describe precautions to be taken in planning, designing and construction of buildings in seismic zones.

**16. Understand
Municipal
Requirement
in planning**

- 16.1 Describe general requirement t municipal requiremen t
- 16.2 State classificati on of building
- 16.3 Explain building regulations of municipal administrat ion

**List Of
Practicals**

Hours

- | | | |
|---|---------------------------------------|---|
| 1 | Draw a job layout plan for a building | 3 |
| | | 6 |

project	
showing,	3
material, plant	3
and	3
accommodatio	6
ns on site.	3
2 Visit for	6
demonstration	6
of pile boring	6
site and draw	3
lay out plan	3
(showing	3
machinery	3
location and	3
other details)	6
3 Draw sketches	
of various	3
shapes of well	3
foundation.	3
4 Draw plan and	6
section of	15
coffer dam and	
caissons.	
5 Sketch	
basement of a	
building and	
show the water	
proofing	
treatments.	
6 Practice in	
laying brick	
floor,	
conglomerate	
floor, mosaic	

floor and tiles
floors.

7 Draw sketches
of various
types of stairs
lifts and
escalators/elev
ators.

8 Demonstration
of laying-out of
typical stair.

9 Demonstration
and practice in
fabrication and
erection of
various form
work.

10 Demonstration
and practice in
removal of
form work,
completed
during
previous week.

11 Visit to under
construction
building
project and
presentation of
visit report.

12 Visit to air
conditioning
plant

13 Visit to a

building
equipped with
central air
conditioning
system.

14 Draw sketches
of various
methods of
ventilation.

15 Draw the cross
section of a
typical
acoustically
treated hall.

16 Treatment of a
damaged
expansion/cons
truction joints,
repair &
maintenance of
old building in
campus.

17 Demonstration
and practice in
knotting,
lashing and
erection of
common
scaffolding

18 Demonstration
and working of
construction
plants as given
in course

contents.

- 19 Visit to a
precast
concrete
factory and
preparation of
its layout and
report.
- 20 Demonstration
of
manufacturing
of tough tiles.
- 21 Renovation &
rehabilitation
of
academic/admini
n block, hostel
& staff colony.

**DAE CIVIL TECHNOLOGY
YEAR 2**

Civil-263

Engineering Mechanics

TOTAL CONTACT HOURS:	160	T	P	C
Theory:	64	2	3	3
Practical:	96			

AIM: On completion, the student will understand and analyze the strength and behaviour of engineering materials & elementary structural members.

Course Contents

1 Centre Of Gravity(C.G)

4 Hours

Introduction and definition of terms used.

Methods of determining C.G

Steps for the calculation of centroid of composite sections.

Calculation of C.G. of various structural sections, i.e. I-Section, H-Section, T-section, Channel Section, Angle Section and Composite Section.

2 Moment Of Inertia.

4 Hours

Introduction and definition of terms used.

Moment of Inertia of rectangle, triangle and circle.

Theorems of perpendicular and parallel axes.

Calculation of moment of inertia of common structural sections, I, T, Circular, Angle and Composite sections.

Calculation of polar moment of inertia for circular sections.

3 Mechanical Properties of Materials

2 Hours

Brief description of Tension, compression, hardness, Toughness, Brittleness, ductility, Resilience, Flexural.

Brinell Hardness Test & Rockwell Hardness test.

4 Shear Force and Bending Moment.

8 Hours

Definition of beam, support and load.

Types of supports, beams and loads.

Calculation of reactions for different types of Statically determinate beams

Introduction to Shear force and bending moment.

Calculation of S.F. & B. M. for different types of beams carrying Point loads, U.D.L. and combined loadings.

Draw S F D and B M D

Drawing of Shear Force Diagram, Bending Moment Diagram.

Calculation of maximum and minimum shear force and bending moments for the

beams and their locations and Point of zero shear and point of contraflexure.
Standard rules and formulas for S.F. and B.M.

5 Simple Stresses and Strains

6 Hours

Introduction, definitions of stress

Description of strain

Hook's Law

4.10 Different moduli

Introduction of universal testing machine, tensile and compression test and stress-strain curve.

Numerical problems.

6 Stresses In Beams

4 Hours

Types of stresses in beams (bending and shearing stresses).

Assumptions in simple bending

Bending equation

Normal stress distribution in beams of Rectangular section.

Practical application and simple problems, based on bending equation.

Shear stress in beams and distribution of shear stress for rectangular, circular and I-sections.

Problems based on shear stress

7 Biaxial Stresses

6 Hours

7.1 Fundamental equations for normal stress and shear stress

7.2 Mohr's circle for biaxial stress.

7.3 General biaxial stress situation.

7.4 Graphical representation by Mohr's circle of stresses,

7.5 Principal stresses and principal planes.

7.6 Maximum shear stress.

7.7 Steps for drawing Mohr's circle.

7.8 Numerical problems.

8. Deflection of Beams.

4 Hours

8.1 Introduction and significance of deflections

8.2 Name of various methods of deflection calculation.

8.3 Maximum deflection in different types of beams.

8.4 Formula for calculation of maximum deflection in cantilever and simply supported beams for various loading conditions.

8.5 Problems of beam deflection by moment area method.

Column. 6 Hours

- 9.1 Introduction of different terms used
- 9.2 Failure patterns of columns
- 9.3 Buckling load, crushing load, safe load, F.O.S, slenderness ratio, radius of gyration, fatigue, effective length of column
- 9.4 End conditions of column
- 9.5 Euler's formula and Rankine's formula
- 9.6 Numerical problems based on Euler's and Rankine's formulae.

Riveted Joints. **rs** 4 Hours

Introduction to different terms related to riveted joints.
Different types of riveted joints.
Failure of riveted joints, strength and efficiency of a joint.
Design of riveted joints, strength, efficiency and pitch.

Welded Joints. 3 Hours

- 11.1 Introduction and comparison of riveted and welded joints.
- 11.2 Types of welded joints.
- 11.3 Design of welded joint, fillet welds only (strength and dimension).

Fundamentals of Steel Structures 2 Hours

- 12.1 Introduction to Steel Structures
- 12.2 Merits of Steel Construction
- 12.3 Demerits of Steel Construction
- 12.4 Types of Structural Steel
- 12.5 Hot Rolled Structural Shapes
- 12.6 Cold-formed Shapes
- 12.7 Built-up Sections
- 12.8 Cladding

Trusses 6 Hours

- 13.1 Introduction of truss, steel truss, parts.
- 13.2 Methods of truss analysis.
- 13.3 Determination of forces in members of statically determinate trusses by method of section and method of joints.

Retaining Walls. 5 Hours

- 14.1 Introduction and description of terms used.
- 14.2 Pressures on retaining wall and stresses at base (toe and heel) Rankine's formula and application.
- 14.3 Stress distribution diagram.
- 14.4 Conditions of stability of retaining wall.
- 14.5 Checking stability of retaining wall.
- 14.6 Numerical problems

Recommended / Reference Books:

- 1 Strength of Materials: **Singer.**
- 2 Strength of Materials: **William A. Nash.**
- 3 Strength of Materials: **R.S. Khurmi.**
- 4 Mechanics of Solids: **F. Warnik.**
- 5 Elementary Structural Analysis : **Schneider**
- 6 Strength of Materials : **G.H. Ryder**
- 7 Mechanics of Structures : **Junarkar**
- 8 Strength of Materials for Civil Engineers: **T. H. G. Megson**, [1987], Van Nostrand Reinhold, UK
- 9 Elementary Structural Analysis: **Charles Head Norris, John Benson Wilber and Senol Utku**, [1987], McGraw-Hill Singapore
- 10 Steel Structures(Revised Second Edition): **Zahid Ahmed Siddiqui & Muhammed Ashraf**

Instructional Objectives

1. Understand the Concept and Computation of Center of Gravity

Define and explain the terms: Center of gravity, Centroid, first moment of area, reference axes, centroidal axes and symmetrical axes.

Describe the methods of finding center of gravity.

- By geometrical consideration

- By the method of moments

Explain the steps for the calculation of centroid of composite sections

Determine position of C. G. for various structural sections i.e. I-section, H-section, T-section, channel section, angle section, Z-section and composite sections by method of moments.

2. Understand the Concept of Moment of Inertia and its Determination

Define moment of inertia, second moment of area, polar moment of inertia, radius of gyration and their units.

State moment of inertia of simple geometrical shapes; rectangle, triangle and circle etc (their formulae).

State perpendicular and parallel axes theorems.

Determine moment of inertia of simple and composite sections by applying parallel axes theorem with sketches.

Determine polar moment of inertia for circular section applying perpendicular axes theorem

3. Understand the Mechanical Properties of Material.

3.1 Define Hardness Tension, compression, hardness, Toughness, Brittleness, ductility, Resilience, Flexural..

3.2 Explain Hardness tests; (a) Brinell's Hardness test (b) Rockwell Hardness test (c) limitations of Brinell's hardness test (d) comparison of Brinell & Rockwall hardness tests..

4. Determine Shear Force and Bending Moment, Draw S.F.D. & B.M.D.

4.1 Define beam, support and load.

4.2 State difference between statically determinate and indeterminate structures.

4.3 Calculate reactions for simply supported, overhanging and cantilever beams under various loading conditions (Point loads-U.D.L & Combined loading).

4.4 Explain shear force & Bending Moment in beams and their significance.

4.5 Calculate shear forces and Bending Moments at various sections of different types of beam, under different loading conditions (Point loads-U.D.L & Combined loadings).

4.6 Draw shear force and Bending Moment diagrams of beams (simply supported beam, over hanging beam & cantilever beam).

4.7 Calculate maximum and minimum shear force and bending moment and determine their positions.

4.8 Explain Point of zero shear, point of contraflexure and their significance and calculations.

4.9 State standard formulas for shear force and bending moments for:

- Simply supported beam subjected to a central point load and U.D.L on a whole span.
- Cantilever beam subjected to a point load at free end and U.D.L on whole span.

5. Understand Behavior of Materials under Simple Stress.

5.1 Define and explain the terms stress, and its types (tensile, compressive and shear)

- 5.2 Define and explain strain, its types (tensile, compressive, shear, linear, lateral and volumetric) and poisson's ratio.
- 5.3 Define and explain Hook's Law.
- 5.4 State modulus of elasticity, modulus of rigidity and bulk modulus.
- 5.5 Explain mechanical properties of materials like elasticity, plasticity, ductility, brittleness and hardness, etc.
- 5.6 Identify parts and attachments of U.T.M for tensile and compression tests. Also explain the salient points in stress strain curve for ductile material.
- 5.7 Numerical problems relating to simple stress, strain, Poisson's ratio and Hook's Law.

6. Understand the Shear and Bending Stresses in a Beam.

Explain the types of stresses in beams (Bending & Shear stresses).

State the assumptions made in theory of simple bending.

State and explain bending equation.

Explain Bending stress distribution across rectangular section.

Solve problems on theory of simple bending.

State formula for shear stress and shear stress distribution across rectangular, circular & I-sections of beam.

Solving problems on shear stress.

7. Biaxial Stresses

7.1 State fundamental equations for normal stress and shear stress.

7.2 Explain Mohr's circle for biaxial stress.

7.3 Describe general biaxial stress situation.

7.4 Describe graphical representation by Mohr's circle of stresses.

7.5 Explain principal stresses and principal planes.

7.6 Explain maximum shear stress.

7.7 State steps for drawing Mohr's circle.

7.8 Solve numerical problems on normal stresses and shear stresses, principal stresses and maximum shear stresses.

8. Understand Deflection of Beams under Loading.

Define deflection of beam and state its significance.

Name various methods of deflection calculation i.e. moment area method, double integration method, Machauly's method and unit load method, etc.

State maximum deflection in different types of beams.

State formulae for calculation of maximum deflection in cantilever & simply supported beam for following loading conditions.

a. For cantilever beam.

- i Point load at free end.
- ii U.D.L on full span.
- iii U.D.L covering a part of span from fixed end
- iv combination of above loads

b. For simply supported beam.

- i Point load at mid span.
 - ii U.D.L on whole span.
 - iii Combination of above loads.
- 8.5 Solve problems of beam deflection by moment area method for above beams and loading conditions.

9. Understand the Behaviours of Columns under Axial Loads.

- 9.1 Define the terms: column, strut, long column, short column, axial and eccentric loading
- 9.2 State failure patterns of short and long columns.
- 9.3 Define the terms: buckling load, crushing load, safe load, F.O.S, slenderness ratio, radius of gyration, fatigue, effective length, etc.
- 9.4 State four end conditions for the calculation of effective length of column.
- 9.5 State Euler's formula & Rankine's formula for calculating ultimate load.
- 9.6 Practice of numerical problems based on Euler's and Rankine's formulae.

10. Understand the Behaviour of Rivetted Joint.

- 10.1 Define terms: Pitch, back pitch, margin, edge distance, nominal diameter of rivets, gross dia of rivets.
- 10.2 Explain the different types of riveted joints.
- 10.3 Explain failure strength and efficiency of riveted joints.
- 10.4 Calculate the strength, efficiency, pitch etc, of riveted joints.

11 Understand the Behavior of Welded Joints.

- 11.1 Define welded joint and compare riveted joints and welded joints
- 11.2 State different types of welded joints
- 11.3 Calculate strength & dimensions of fillet welded joints only.

12 Understand the theoretical fundamental concepts of Steel Structures

- 12.1 State the types of steel structures
- 12.2 Describe the merits of steel construction
- 12.3 Describe the demerits of steel construction
- 12.4 State the types of structural steels
- 12.5 Describe and sketch the hot rolled structural shapes
- 12.6 Describe and sketch the cold formed shapes
- 12.7 Describe and sketch the built-up sections
- 12.8 Define cladding

13 Understand the Effect of Loads on Statically Determinate Truss.

- 13.1 Define truss, state types and parts of steel trusses.
- 13.2 State methods of truss analysis.
- 13.3 Determine forces in members of statically determinate truss by method of joints & method of sections.

14 Understand Stability and Stresses Developed in Retaining Walls.

- 14.1 State the terms: retaining wall, classification of retaining wall, angle of repose, level & surcharge backing, active and passive earth pressure.

- 14.2 Explain the pressures on retaining wall and stresses at base (toe and heel) Rankine's formula and its applications.
- 14.3 Describe the stress distribution diagram at base of the retaining wall.
- 14.4 Describe conditions of stability of retaining walls.
- 14.5 Check and compare the results of stability of retaining walls with standards in numerical problems.
- 14.6 Numerical problems relating to stresses at base of retaining wall.

List Of Practicals		Hours
1.	Solving problems of centroid for composite sections.	3
2.	Solving problems of M.O.I for composite sections.	6
3.	To find the relation between the stress and strain of a given copper wire with the help of a Young's modulus apparatus. Plot a graph between the stress and strain. Hence find the Young's modulus of the material of the wire.	3
4.	To find tensile strength of a mild steel specimen plotting and interpretation of stress strain curve.	6
5.	Draw S.F.D. and B.M.D in case of simply supported beams under various loading conditions.	3
6.	Draw S.F.D. & B.M.D in case of over hanging beams under various loading conditions.	6
7.	Draw S.F.D & B.M.D of cantilever beams under various loading conditions.	6
8.	Practice in designing the homogeneous beam by simple bending equation.	6
9.	Drawing of bending and shear stress distribution for symmetrical sections of beams.	3
10.	Solving problems on principal stresses and maximum shear stress and drawing Mohr's circle.	9

11.	Show by means of deflection of beam apparatus that the deflection is proportional to the cube of span also draw a graph and also show that the deflection is proportional to the load.	6
12.	Solving problems on deflection of beams	6
13.	Solving problems on Euler's and Rankine's formulae.	6
14.	Design & drawing of butt-joint and lap joint.	6
15.	Design problems on welded joints	6
16.	Practice in finding stresses in various members of a given truss by joint and section methods.	6
17.	Check stability of given retaining wall.	6
18.	Sketch stress distribution diagrams for retaining walls.	3

DAE CIVIL TECHNOLOGY
YEAR 2

Civil-232

QUANTITY SURVEYING

TOTAL CONTACT HOURS:	128	T	P	C
Theory:	32	1	3	2
Practical:	96			

AIM: The student will be able to understand the procedures governing estimation of earth work and complete estimate of single storey building in order to:

- 1.1.1. Work out the rate analysis and material statement of various items of work.
- 1.1.2. Understand complete estimates of bituminous and concrete roads, and sewerage scheme.

Course Contents

1. Introduction

3Hours

Review of area, perimeters and volumes of various plane and solid geometrical figures.
Estimate and its types.
Data for estimating.
Various units of measurement and their conversion.(FPS, MKS and SI Units)

2. Specifications.

2 Hours

Definition *and* purpose of specifications
Principle of writing specs
General specifications.
Detailed specifications of all items of work.

3. Building Estimates.

6 Hours

Terms used in quantity surveying (provisional sum, prime cost, input rates, MRS, CSR, Premium, rebate, contingencies, petty establishment charges, cost, value, bill, BOQs, and ***FIDIC***).
Rough cost estimate of Buildings *with different methods*.
P.W.Ds, MES and English method of writing measurement in MB.
Methods of detailed ***Estimate***.
Instructions on working out quantities of various types of wall Shapes/sections.
Rules for deduction in different ***items of*** work.
Instructions on working out quantities and Abstract of quantities of various items of work of a single storey building (building portion only).
Study of schedule of rates and preparation of abstract of cost for all item of work of a single storey building (building portion only).
Annual and special repair estimates for building maintenance.

4. Earth Work

4 Hours

Units of measurement/payment, methods of calculation.
Technical terms used in earth work (lead, lift, dead man, borrow pit).
Preparation of proforma for earth works.

Taking out quantities for embankment, roads in plain and hills and irrigation channel (including re-modelling).

5. Road Estimates.

3 Hours

Types of road & their structures along with *technical* terms

Units of measurements/payments.

Instruction regarding complete estimate of bituminous road, cement concrete road. (for original & repair works)

6. Rate Analysis.

5 Hours

Definition & prerequisite for analysis of rates

Labor required for constructional work.

Instruction on Market rates, (Materials, labour, carriage and equipment) (PWD, MES Rate Schedules)

Schedule of labour, schedule of equipment, hiring and cost owing, of machinery work their output.

Rate analysis for:

- Cement concrete of different ratios.
- Brick work in cement mortar.
- Cement conglomerate floor
- Dry brick paving.
- Cement plaster of given ratios.
- Cement pointing (Struck & Flush type)
- White washing/ Distemper to wall and painting to doors/windows.

Material statement for various items of building work.

7. Sewerage and Water Supply Schemes.

4 Hours

Items of work for water supply and sewerage (Internal and External)

Units of measurements & payments.

Rough cost estimate for water supply and sewerage schemes.

Detailed estimate for sewer line and its appurtenance (Manholes)

Prepare hydraulic statement for a sewerage scheme comprising of 10 manholes.

Prepare hydraulic statement for a water supply scheme for 1000 ft. length in five parts

8. Valuation of Property.

5 Hours

Introduction-definition and purpose of valuation.

Methods of valuation

Sinking fund, scrap value, salvage value, market value, book value, assessed value; potential value, year purchase, Monopoly value, annuity, gross income, net income, outgoing, price variation etc.

Depreciation of buildings-methods of calculating depreciation.

Depreciation of Machinery-methods of calculating depreciation.

Calculation of standard rent of buildings on capital %age basis method

Recommended / Reference Books:

1. Rasul Manual No.4 on Estimating.
2. Estimating and Costing: BN Dutta.
3. Estimating and Costing: M.A. Aziz.
4. Construction Cost Estimating: Len Holm, John Schaufelberger, Dennis

- Griffin and Thomas Cole**, [2005], Prentice-Hall, USA
5. Civil Engineering Quantities: **Ivor Seeley and George P. Murray**, [2001], Palgrave Publishers
 6. Estimating and Costing by GS Bridge.
 7. ***Construction Cost Estimates by US Army Corps of Engineer (UFC)***
 8. **Standard Methods of Measurement** (Released by PEC Body)

Instructional Objectives

1. **Know the Importance and Types of Estimates of Works.**

State formulae for area, perimeters and volumes of various plane and solid geometrical figures.

State the units FPS, MKS and SI.

Convert the units.

Describe the importance of estimates.

State the data required for preparation of estimates.

State the type of estimate.

2. **Understand Specifications of all Items of Works of a Building & Road.**

Define specifications.

Explain the purpose and types of specification.

State general specifications of a building & Road.

Discuss the detailed specifications of important items of works.

3. **Understand Principles Involved in Preparation of Building Estimates.**

Terms used in quantity surveying (provisional sum, prime cost, input rates, MRS, CSR, Premium, rebate, contingencies, petty establishment charges, cost, value, bill and BOQs).

Prepare rough cost estimate of a building from given line plan or covered area.

Distinguish between P.W.D and English method of recording measurements.

List the all items of works for a residential building (only building position except public health and electrification installation).

Determine quantities of all items of works for straight; D,F,H,T,U shaped walls and circular walls.

Workout quantities of all items of works for a single storey building (building portion only) from given drawings.

Prepare bill of quantities and abstract of cost with the help of composite schedule of rates.

Prepare annual and special repair estimate for a given building.

4. **Understand the Principles Involved in Calculation of Earth Work for Embankments, Roads, and Irrigation Channels etc.**

State data required for computation of earth works.(Intermediate point-IMP)

Explain methods to determine quantity of earth work and their respective proforma (mid area, mean area, coordinates Prismoidal & Graphical).

Work out (determine) quantity of earth work for embankments, roads and irrigation channels.

Explain remodeling of irrigations channels.

Work out quantity of earth work for remodeling of a channel from given x-sections of channels.

5. **Understand the Preparation of Detailed Estimate of Various Types of Roads.**

Describe parts of road structure and their specifications.

State the units and method of measurement of all items of works for a road.

Prepare detailed & repair estimate for bitumen and cement concrete road.

6. **Understand Rate Analysis of Major Items of Works.**

Describe the purpose of rate analysis.

Explain prerequisites for analysis of rate of items of works, i.e. market rates of

materials and labour, carriage, out-turn of labour, specifications, overhead costs etc labour required for different constructional works out put of machinery.
Determine quantity of materials required for various items of building works.
Prepare material statement for various items of building works.
Prepare analysis of rates for important items of work as given in subject contents.

7. **Understand Detailed Estimate for Water Supply and Sewerage Schemes**

List all item of works for a sewer line and their measurement units.
Explain the preparation methods rough cost estimate of water supply and sewerage schemes.
Work out quantities of each item of work for sewer line and manhole from given drawing.
Prepare bill of quantities and abstract of cost.

8. **Understand Valuation of Building and Fixation of Rent.**

State the purpose of valuation.
Explain terms, book value, market value, salvage value, scrap value, sinking fund, year's purchase, annuity, capitalized value, depreciation and price variation.
Determine the depreciation of a building by straight line method, constant percentage method and sinking fund method.
Determine the depreciation of machinery.
Determine the value of a building by rental method, valuation based on profit and depreciation method.
Determine rent for government and private building

List Of Practicals	Hours
1. Preparation of rough cost estimates of buildings.(Using different types of units) and Writing specifications/Description of various items.	9
2. Taking out measurements of a straight wall, T, L, H, U, shaped walls and circular walls.	9
3. Complete estimate of a single storey building. (Except Public Health Installations & Electric Installations)	12
4. Preparation of annual repair/special repair estimates. (Building and Roads)	6
5. Working out earth work of earthen embankment of given design and data.	6
6. Working out earth work of road in plain areas.	3
7. Working out earth work of road in hilly areas.	3
8. Working out earth work of irrigation channel.	3
9. Complete estimate of arterial roads (bituminous and concrete road).	9

10. Preparation of material statements of Brick work, foundation concrete, RCC, Cement plaster, DPC, Cement pointing, whitewashing of building works.	6
11. Rate analysis for various items of building work viz cement concrete of different ratios, Brick work in cement mortar in foundation and plinth and superstructure, dry brick paving, cement plaster of ratios, cement pointing, white washing.	12
12. Preparation of rough cost estimate of water supply scheme 1000 ft length comprising of rising main and 5 branches including analysis of rates for works and preparation of hydraulic statement.	9
13. Calculation of present market value of an existing building by standard rent method and depreciation method.	6
14. Calculation of standard rent of government buildings	3

**DAE CIVIL TECHNOLOGY
YEAR 2**

Civil-271

ENTREPRENEURSHIP

TOTAL CONTACT HOURS:	32	T	P	C
Theory:	32	1	0	1
Practical:	0			

AIM: The student will be able to understand the procedures governing estimation of earth work and complete estimate of single storey building in order to:

- 1- Understanding the concept and elements of small business enterprise.
- 2- Apply the techniques for generating business ideas as well as for identifying and assessing business opportunities.
- 3- Understand the procedures required for establishing an enterprise.
- 4- Understand the procedures for assessing market and for selecting location for a small business.
- 5- Understand the importance of financial record keeping in a small business.
- 6- Develop business plan and evaluate it in real market situation.
- 7- Apply the concepts of Chemical / Pharmaceutical Engineering on planning, designing and layout of related technical projects.

Course Contents

- | | | |
|---------------|--|--------------------|
| 1- | Entrepreneurship and Management | 4Hours |
| 1.1 | The concept of entrepreneurship | |
| 1.2 | Entrepreneurial style Vs Managerial style | |
| 1.3 | Terminology used in entrepreneurship | |
| 1.4 | Classification of business; difference between social and commercial business | |
| 1.5 | Reasons for Entrepreneurship; importance in society, self employment, benefits & limitation, Importance of relations/links | |
| 1.6 | Entrepreneurial motivation; setting goals and risk assessment. | |
| 1.7 | Small enterprises; elements, ideas, motivation, resources, business plan etc. | |
|
2- |
Entrepreneurship and innovation |
3 Hr |
| 2.1 | Creativity and innovation; creativity potential, techniques for developing creative abilities | |
| 2.2 | Business ideas; resources of business ideas, collective thinking and creative thinking, | |
| 2.3 | Risk involved in innovation | |
| 2.4 | Identifying and assessing business opportunities | |
|
3- |
Entrepreneurs |
5 Hours |

- 3.1 Entrepreneurial characteristics
- 3.2 Assessment of entrepreneurial potential; assessment of individuals
- 3.3 Entrepreneurial Leadership: abilities for a successful businessman
- 3.4 Self discipline; check list for attaining self discipline
- 3.5 Decision making skills; steps for decision making, rating of decision making skills
- 3.6 Principles of negotiation; resolving business issues through negotiation

4- **Establishment of An Enterprise**

8 Hours

Market; Five 'W' of market, competitors, assessment of market size & demand
 Business location; importance, selection of site
 Legal forms of business; Proprietorship, Partnership, limited company, Cooperative, advantages & disadvantages
 Costing of product; direct and indirect cost
 Break even analysis: fixed and variable costs, calculating break even indicates & applications
 Finance & sources of financing; equity financing & loan financing, initial capital & working capital estimation

5- **Management of an Enterprise**

8 Hours

Hiring and managing people; hiring procedures, term & condition of services and Job description etc.
 Managing sales & supplies; characteristics of successful sales personals, importance of advertisement, life cycle of product, selection of supplies, work order, delivery & payment etc.
 Management of capital; operating cycle concept, management of cash & stock etc.
 Accounting and book keeping: cash book, balance sheet etc.
 Income tax; income tax returns, computation of business income
 Sales tax; basic scheme of sale tax, assessment of return etc.

6- **Business Plan**

4 Hours

Purpose of business plan
 Components of business plan; outline, process of writing business plan
 Analysis of business plan: feasibility; breakeven point, evaluating problem in starting business
 Standard business plan

Recommended / Reference Books:

Small Business and Entrepreneurship by Paul Burns and Jim Dew Hurst.
 Innovation and Entrepreneurship By Peter F. Drucker
 Entrepreneurial Success By John B. Miner
 Entrepreneurship for economic Growth by P.N Singh
 Knowing About Business (KAB), ILO

INSTRUCTIONAL OBJECTIVES

- 4.1- Understand the concept and elements of Entrepreneurship**
 - 1.a.1 Define entrepreneurship
 - 1.a.2 Explain the concept of entrepreneurship
 - 1.a.3 Explain the various types of enterprise that exist in the community
 - 1.a.4 Identify and interpret the terms and elements involved in the concept of enterprise
 - 1.a.5 Appreciate that the advancement of individual and society in general when entrepreneurship is adopted
 - 1.a.6 Explain various motivational factors that entrepreneurs possess and utilize.
 - 1.a.7 Exhibit the skills needed to assess and evaluate a risk
 - 1.a.8 Describe the outline of small enterprise

- 4.2- Understand the techniques for generating business ideas as well as for**

identifying and assessing business opportunities

- 2.1 Describe the creativity and innovation
 - 2.2 Apply the techniques for developing creative abilities
 - 2.3 Explain the resources of business idea
 - 2.4 Explain the collective and creative thinking
 - 2.5 Explain how to generate a business idea
 - 2.6 Appreciate the importance of, and possess techniques for identifying and assessing business opportunities.
-
- 4.3- **Understand personal characteristics needed to be a successful entrepreneur**
 - 3.1 Identify the various entrepreneurial characteristics
 - 3.2 Assess personal potential for becoming future entrepreneurs.
 - 3.3 Identify leadership qualities which are essential to the success of entrepreneurs
 - 3.4 Identify self- management skills and how they are important to be enterprising
 - 3.5 Apply a rational approach to make personal and business decisions
 - 3.6 Explain the steps for decision making and rating of decision making skills
 - 3.7 Apply the rules of negotiation for resolving business issues
-
- 4.4- **Understand the procedures required for establishing an enterprise**
 - 4.1 Describe the market & marketing
 - 4.2 Differentiate between sellers and buyers' market
 - 4.3 Describe the five 'w' of market
 - 4.4 Explain the procedure for assessing the market size and demand
 - 4.5 Explain the major factors to be considered when selecting a location for a business
 - 4.6 Describe the basic types of business ownership and the limitation of each
 - 4.7 Explain the computation of initial and working capital needed to start an enterprise
 - 4.8 Identify the advantages and disadvantages of using various sources of capital to start an enterprise
 - 4.9 Explain the component of cost of product
 - 4.10 Explain the break even analysis for a new business
 - 4.11 Calculate the breakeven point for various new business
-
- 4.5- **Understand the various techniques that affect the management of an enterprise.**
 - 5.1 Describe the hiring method/Procedures
 - 5.2 Describe the term & conditions of services and job description for various employments
 - 5.3 Describe the characteristics of successful sales persons
 - 5.4 Describe the life cycle of product
 - 5.5 Identify the various ways of selecting suppliers,
 - 5.6 Explain the inventory management of stock, raw material and finished goods etc.
 - 5.7 Appreciate the importance of financial record keeping in a small business
 - 5.8 Explain techniques to keep cost as low as possible

- 5.9 Develop balance sheet for a small enterprise
- 5.10 Explain the operating cycle concept
- 5.11 Explain the income tax computation procedure for a small business
- 5.12 Explain the basic scheme of sales tax
- 5.13 Explain the assessment procedure for returns and filling of returns.

- 4.6- **Apply the entrepreneurship knowledge for development of business plan for a small business and evaluate in a real market situation.**
- 6.1 Appreciate the importance of business plan
- 6.2 Explain the process of writing a business plan
- 6.3 Develop feasibility for a business idea
- 6.4 Realize the problem that may be encountered when starting a small business/Enterprise
- 6.5 Develop a business plan for a small business on the standard format
- 6.6 Evaluate the business plan in a real market satiation

DAE CIVIL TECHNOLOGY
YEAR 3

0801939

“Chinese” For Road And Bridge Engineering Technology

TOTAL CONTACT HOURS:	32	T	P	C
Theory:	32	1	0	1
Practical:	0			

Students will be able to:

AIMS:

1. Master the professional Chinese language knowledge and skills required to work in China in the future
2. Understand, speak, read, write and translate in Chinese in the field of road and bridge engineering
3. Independently read books of road and bridge engineering in Chinese

Course Contents	Hours
2. Construction Law, Regulations on Quality Management of Construction Projects	2
3. Safety Production Law, Safety Production Management Regulations of Construction Projects	2
4. Highway Act	2
5. JTG 1001-2017 Highway Engineering standard System	2
6. JTG B01-2014 Technical standard for highway engineering	2
7. JTG D20-2017 Code for highway route design	2
8. JTG D30-2015 Code for highway subgrade design	2
9. JTG D40-2011 Specification for design of cement concrete pavement of highway	2
10. JTG D50-2017 Code for design of highway asphalt pavement 2	2
11. JTG D60-2015 General code for design of highway Bridges and culverts	2
12. JTG/T D70-2010 Highway tunnel design rules	2
13. JTG/T 3610-2019 Technical specification for highway subgrade Construction	2
14. JTG/T F20-2015 Technical rules for Highway pavement base construction	2
15. JTG/T F30-2014 Technical rules for construction of Highway cement concrete pavement	2
16. JTG F40-2004 Technical code for construction of highway asphalt pavement	2
17. JTG F90-2015 Technical code for construction safety of highway engineering	2

Recommended / Reference Books:

2. Construction Law.
3. Regulations on Quality Management of Construction Projects
4. Safety Production Law.
5. Safety Production Management Regulations of Construction Projects
6. Highway Act
7. JTG 1001-2017 Highway Engineering standard System
8. JTG B01-2014 Technical standard for highway engineering
9. JTG D20-2017 Code for highway route design

10. JTG D30-2015 Code for highway subgrade design
11. JTG D40-2011 Specification for design of cement concrete pavement of highway
12. JTG D50-2017 Code for design of highway asphalt pavement 2
13. JTG D60-2015 General code for design of highway Bridges and culverts
14. JTG/T D70-2010 Highway tunnel design rules
15. JTG/T 3610-2019 Technical specification for highway subgrade Construction
16. JTG/T F20-2015 Technical rules for Highway pavement base construction
17. JTG/T F30-2014 Technical rules for construction of Highway cement concrete pavement
18. JTGF40-2004 Technical code for construction of highway asphalt pavement
19. JTGF90-2015 Technical code for construction safety of highway engineering

Instructional Objectives

1. Master the professional vocabulary related to construction project quality management in construction Law and Regulations on Construction Project Quality Management;
2. Master the professional vocabularies related to construction project safety management in safety Production Law and Construction Project Safety Production Management Regulations;
3. Be familiar with the professional vocabulary in the Highway Law;
4. Master professional vocabulary in JTG 1001-2017 Highway Engineering Standard System
5. Master the professional vocabulary in JTG B01-2014 Technical Standard for Highway Engineering
6. Master the professional vocabulary in JTG D20-2017 Code for Highway Route Design
7. Master the professional vocabulary in JTG D30-2015 Code for Highway Subgrade Design
8. Master the professional vocabulary in JTG D40-2011 Code for Design of Highway Cement Concrete Pavement
9. Master the professional vocabulary in JTG D50-2017 Highway Asphalt Pavement Design Code
10. Master the professional vocabulary in JTG D60-2015 General Code for Highway Bridge and Culvert Design
11. Master the professional vocabulary in JTG/TD70-2010 Detailed Rules for Highway Tunnel Design
12. Master the professional vocabulary in JTG/T3610-2019 Technical Specification for Highway Subgrade Construction
13. Master professional vocabulary in JTG/TF20-2015 Technical Rules for Highway Pavement Base Construction
14. Master professional vocabulary in JTG/TF30-2014 Technical Rules for Construction of Cement Concrete Road Surface
15. Master the professional vocabulary in JTGF40-2004 Technical Specification for Highway Asphalt Pavement Construction
16. Master the professional vocabulary in JTGF90-2015 Technical Code for

Construction Safety of Highway Engineering

**DAE CIVIL TECHNOLOGY
YEAR 3**

0801949 **Road engineering drawing, Drawing Recognition and AutoCAD**

TOTAL CONTACT HOURS:	160	T	P	C
Theory:	64	2	3	3
Practice:	96			

AIMS: Enable students to:

1. Good command of projection principle and projection drawing
2. Be familiar with the requirement and specification of road engineering drawing
3. Master the drawing of road engineering drawings
4. Understand the main structural characteristics and methods of roads
5. Master the content and drawing method of route plan.
6. Master the content and drawing method of longitudinal section map of route.
7. Master the contents and drawing methods of road cross section drawing, road structure, drainage protection engineering drawing, etc.
8. Proficient in using software to draw construction drawings of road bridge and culvert engineering.

COURSE CONTENTS

1. Mapping based	4
1.1 1. Basic provisions of cartography	
1.2 2. Draw geometry	
1.3 3. Drawing steps	
2 Basic graphics projection drawing	36
2.1 Projection formation and types, engineering applications	
2.2 Projection rule of three views: point, line and plane	
2.3 Basic body, surface point line, intersection and intersecting line	
2.4 The projection law and drawing of the three views of the assembly	
2.5 The formation, characteristics and drawing method of axonometric map	
2.6 The drawing method of sectional view and sectional view	
2.7 Elevation projection of point line, plane and surface and engineering application	
3 Highway engineering plan	4
3.1 Route plan, vertical section and cross section	
3.2 Culvert engineering drawing	
3.3 Bridge engineering layout plan	
3.4 Reinforced concrete structure drawing of bridge	
4 Fundamentals of Autocad drawing	4
4.1 The working interface of the software	
5 Draw basic engineering graphics	4

5.1 Master common drawing commands and basic modification commands of software	
5.2 Master layer and block Settings	
5.3 Size and text marking	
5.4 Boilerplate and multiscale drawing	
6 Read and draw route engineering drawings	4
6.1 Be able to read and draw route planes, vertical sections, cross-sections, etc	
7 Read and draw culvert engineering drawings	4
7.1 Be able to read and draw culvert profiles, planes and sections	
8 Read and draw bridge engineering drawings	4
8.1 Be able to read and draw reinforced concrete bridge general layout drawings (elevation, plane and transverse section), component drawings (beam, pier, abutment, reinforcement drawings) and detailed drawings	

Recommended/Reference books:

1. Road Engineering Drawing (3rd Ed.), Luo Yuzhu, Dalian University of Technology press
2. Road engineering drawing problem set, Shao Lifang, Dalian University of Technology press
3. Road Engineering Drawing and CAD (3rd Ed.), Wang Guxiang, people's Communications publishing house

INSTRUCTIONAL OBJECTIVES

1. Mapping based

- 1.1 Understand the basic rules of drawing;
- 1.2 Able to draw all kinds of geometric figures;
- 1.3 Have standard and reasonable drawing sequence and habit

2. Basic graphics projection drawing

- 2.1 Master the rules and methods of three-view projection drawing of point, line, plane, basic body and combination;
- 2.2 Master axonometric projection drawing method;
- 2.3 Be able to draw sections and sections correctly;
- 2.4 Be able to draw elevation projection map of plane and surface in engineering.

3. Highway engineering plan

- 3.1 Be able to read route plans, vertical sections and cross-sections
- 3.2 Be able to read culvert engineering drawings
- 3.3 Be able to read bridge engineering layout and reinforced concrete structure drawing

- 4. Fundamentals of Autocad drawing**
 - 4.1 Be familiar with the working interface of the software, able to open drawing software, create and save files, call the toolbar, select graphics, etc
- 5. Draw basic engineering graphics**
 - 5.1 Be able to use software commands to draw road engineering basic diagram graphics and component samples, correctly mark the size and text, set up the map proportion
- 6. Read and draw route engineering drawings**
 - 6.1 Be able to read and draw route engineering drawings correctly with software
- 7. Read and draw culvert engineering drawings**
 - 7.1 Able to read and draw culvert engineering drawings correctly with software
- 8. Read and draw bridge engineering drawings**
 - 8.1 Able to read and draw bridge engineering drawings correctly using software

LIST OF PRACTICALS		Hours
1.	Complete the road engineering drawing problem set	32
2.	Draw route plan, vertical section, cross section and road structure drawing manually as required	12 16
3.	Draw basic engineering graphics	12
4.	Draw route engineering drawings	12
5.	Drawing culvert engineering drawings	12
6.	Draw bridge engineering drawings	

DAE CIVIL TECHNOLOGY
YEAR 3

0801579

Road survey and design

TOTAL CONTACT HOURS:	128	T	P	C
Theory:	32	1	3	2
Practice:	96			

GOAL: Enable students to:

1. Master the basic principles and methods of road alignment design, internal and external work contents and methods of route survey and special requirements of alpine areas;
2. To master the compilation of road survey and design procedures and design documents of highway capital construction projects;
3. Understand the general principles and methods of highway route selection and alignment, the basic principles, contents and methods of road network and old road technical transformation.

COURSE CONTENTS	Hours
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1. Basic cognition of highway survey	4
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1.1 Collect technical data and make work plan

2. Highway route graphic design	8
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1.2 Finish the route plane design preparation results

3. Highway route longitudinal section design	8
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1.3 Complete the longitudinal section design and compilation results

4. Highway route cross section design	8
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1.4 Complete the route cross - section design and compilation results

5. Route selection and alignment of highways	4
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1.5 Finish line selection on paper and line setting on the spot

Recommended/Reference books:

1. Highway Survey and Design (4th edition), Chen Fangye, People's Communications Publishing house

INSTRUCTIONAL OBJECTIVES

1. **Basic cognition of highway survey**

1.1 Able to define the design process

1.2 Able to collect design specifications, calculation basis, etc

2. Highway route graphic design

2.1 Be able to select and analyze technical indicators according to technical standards

2.2 Ability to design route plans

2.3 Be familiar with design and drawing software

3. Highway route longitudinal section design

3.1 Be able to select and analyze technical indicators according to technical standards

3.2 Able to design longitudinal plane of route

3.3 Be familiar with design and drawing software

4. Highway route cross section design

4.1 Be able to select and analyze technical indicators according to technical standards

4.2 Be able to design the transverse plane of the route

4.3 Be familiar with design and drawing software

5. Route selection and alignment of highways

5.1 Able to complete line selection on paper

5.2 Able to use mapping tools to complete field alignment

LIST OF PRACTICALS	Hours
1. Basic cognition of highway survey	8
1.1 Collection of relevant technical specifications	
1.2 Route design work plan	
2. Highway route graphic design	16
2.1 Route plan	
2.2 List of lines and curves and corners	
3. Highway route longitudinal section design	16
3.1 Longitudinal section plan of the route	
3.2 List of longitudinal and vertical curves	
4. Highway route cross section design	16
4.1 Standard cross - section drawing of roadbed	
4.2 . Cross-sectional design drawing of roadbed	
4.3 Table of earthwork quantity of roadbed	
5. Route selection and alignment of highways	14
5.1 The report to select	
5.2 Road center line marked on the spot	
6. Compile highway survey and design cases	26

DAE civil technology

year 3

0801149

Soil mechanics and foundation engineering

TOTAL CONTACT HOURS:	128	T	P	C
Theory:	32	1	3	2
Practice:	96			

GOAL: Enable students to:

1. Be familiar with the test procedures of conventional geotechnical tests and the names and operation methods of corresponding equipment and instruments, and be proficient in reading engineering geological survey reports;
2. Grasp the basic concepts of soil strength and deformation;
3. Master the common practice of foundation pit support;
4. Master the types and basic design principles of retaining walls;
5. Master the basic knowledge of shallow foundation on natural foundation;
6. Understand the form, characteristics and design principle of deep foundation;
7. Master the principle of foundation treatment, Be familiar with all kinds of foundation treatment methods

COURSE CONTENTS

Hours

1. Geological survey report reading

4

- 1.1 Physical and mechanical properties of soil
- 1.2 Geotechnical experiment and engineering classification
- 1.3 Reading of engineering geological survey report

2. Retaining wall design

4

- 2.1 Earth pressure type
- 2.2 Rankine, Coulomb earth pressure theory
- 2.3 Retaining wall design theory
- 2.4 Soil slope stability analysis

3. Shallow foundation construction and design

6

- 3.1 Type of foundation, choice of embedding depth
- 3.2 Determination of foundation bearing capacity
- 3.3 Design calculation of shallow foundation

4. Foundation treatment

6

- 4.1 Basic knowledge of foundation treatment
- 4.2 Earth change bedding method

4.3 Compacted pile composite foundation

4.4 Preloading consolidation

5. Foundation pit supporting

6

5.1 Earth pressure and slope stability

5.2 The foundation pit precipitation

5.3 Foundation pit excavation and support

6. Foundation engineering construction

6

6.1 Shallow foundation construction

6.2 Prefabricated pile construction

6.3 Construction of cast-in-place piles

Recommended/Reference books:

1. Soil mechanics and Foundation (2nd Ed.), Li Wenying, China Railway Publishing House
2. Soil mechanics and Roadbed (3rd Ed.), Li Wenying, China Railway Publishing House

INSTRUCTIONAL OBJECTIVES

1. Geological survey report reading

1.1 Be familiar with and understand the content of geological survey report

1.2 Analyze the influence of geological climate on engineering

1.3 Ability to identify soil properties and properties

2. Retaining wall design

2.1 Able to design retaining walls

3. Shallow foundation construction and design

3.1 Able to read shallow foundation construction drawings

3.2 Able to design on natural shallow foundations

4. Foundation treatment

4.1 Implement the quality management standard of foundation treatment

4.2 Make quality disclosure according to the common quality treatment measures

4.3 Implement acceptance specifications for concealed works

5. Foundation pit supporting

- 5.1 Implement the quality management standard of foundation pit supporting
- 5.2 Make quality disclosure according to the common quality treatment measures
- 5.3 Implement acceptance specifications for concealed works

6. Foundation engineering construction

- 6.1 Implement basic quality management practices
- 6.2 Make quality disclosure according to the common quality treatment measures
- 6.3 Implement acceptance specifications for concealed works

LIST OF PRACTICALS		Hours
1. Geological survey report reading		12
1.1 Geotechnical test report		
1.2 Geological survey data submission report		
2. Retaining wall design		12
2.1 Retaining wall design calculations		
3. Shallow foundation construction and design		18
3.1 Calculation of shallow foundation design		
4. Foundation treatment		18
4.1 Foundation treatment construction scheme		
5. Foundation pit supporting		18
5.1 Foundation pit supporting construction scheme		
6. Foundation engineering construction		18
6.1 Foundation construction plan		

DAE civil technology
YEAR 3

0801219

Roadbed and pavement engineering

TOTAL CONTACT HOURS:	128	T	P	C
Theory:	32	1	3	2
Practice:	96			

GOAL: Enable students to:

1. Master the characteristics of roadbed and pavement engineering materials
2. Master the influencing factors such as vehicle and road environment
3. Master the design theory and method of roadbed support and reinforcement, asphalt pavement, cement concrete pavement, roadbed pavement drainage and so on
4. Understand the construction process characteristics and methods of roadbed and pavement engineering
5. Be familiar with roadbed and pavement structure layer material test and detection method
6. To master the stability design of roadbed by simplified Bishop method

COURSE CONTENTS	Hours
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2. Basic cognition of Highway	4
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- 1.1 Composition of highways
- 1.2 Characteristics of roadbed engineering
- 1.3 Classification and engineering characteristics of subgrade soil

2 Subgrade construction	6
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- 2.1 Construction of fill embankment
- 2.2 The subgrade compaction
- 2.3 Retaining wall construction
- 2.4 Protection engineering
- 2.5 Quality standard for subgrade engineering
- 2.6 To prepare the construction technical plan

3 Asphalt pavement construction	6
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- 3.1 Asphalt road facing material requirements
- 3.2 Asphalt mixture mix design method, construction technology
- 3.3 Complete mix design
- 3.4 Compile technical plan for pavement construction

4 Cement pavement construction	6
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- 4.1 The construction of cement concrete pavement
- 4.2 Commonly used cement concrete pavement construction machinery
- 4.3 Quality control of cement concrete pavement
- 4.4 Compile technical plan for pavement construction

5 Acceptance criteria	6
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- 5.1 Quality standards for roadbed and pavement

6 Subgrade stability

4

6.1 The simplified Bishop method is used to design the stability of subgrade

Recommended/Reference books:

1. Roadbed and Pavement Engineering, Ou Changbao, Shi Quanbin, Peking University Press

INSTRUCTIONAL OBJECTIVES

1. Basic cognition of Highway

- 1.1 It can judge the dry and wet types of constructed roads and newly built roads;
- 1.2 Can judge the relationship between subgrade work area and subgrade fill height

2. Subgrade construction

- 2.1 To complete the construction of filling roadbed, excavation roadbed;
- 2.2 Able to complete the construction of roadbed protection engineering;

3. Asphalt pavement construction

- 3.1 Be able to make construction plan
- 3.2 Can calculate the amount of work
- 3.3 Able to complete mix design

4. Cement pavement construction

- 4.1 Able to review drawings and calculate quantities
- 4.2 Will prepare the construction plan

5. Acceptance criteria

- 5.1 Able to complete completion acceptance

6. Subgrade stability

- 6.1 Master roadbed stability analysis and design checking method;
- 6.2 Be familiar with relevant codes and standards of roadbed and pavement engineering

LIST OF PRACTICALS

Hours

1. Basic cognition of Highway

8

- 1.1 Table of dry and wet types

2. Subgrade construction

16

- 2.1 Technical scheme of roadbed construction
- 2.2 Technical scheme of protection engineering

3. Asphalt pavement construction

16

- 3.1 Mix proportion design

3.2 Asphalt pavement construction scheme	
4. Cement pavement construction	16
4.1 Drawing review report	
4.2 Cement pavement construction scheme	
5. Acceptance criteria	14
5.1 The acceptance report	
6. Subgrade stability	26
6.1 Subgrade stability analysis report	

DAE CIVIL TECHNOLOGY
YEAR 3

0801229

Bridge and culvert construction technology

TOTAL CONTACT HOURS:	160	T	P	C
Theory:	64	2	3	3
Practical:	96			

- AIM:**
1. Apply technical Specifications for Construction of Highway Bridges and Culverts and bridge construction manuals to guide the construction of individual projects according to procedures
 2. Conduct construction survey and lofting
 3. Participate in the quality inspection of the project in accordance with the construction quality standards stipulated in the Technical Specifications for Construction of Highway Bridges and culverts
 4. Describe the new structure, new method and new technology in bridge and culvert engineering

Course Contents	Hours
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1. Construction method of bridge foundation engineering	2
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- 1.1. Understand the bridge and culvert construction technology overview
- 1.2. Classification of construction methods
- 1.3. Bridge and culvert construction preparation

2. Bridge and culvert standing structure and main lifting equipment	4
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- 2.1. The steel sheet pile
- 2.2. The scaffold
- 2.3. Bowl buckle type support frame
- 2.4. Universal member
- 2.5. Bailey truss
- 2.6. Block
- 2.7. Purchase
- 2.8. The chain block
- 2.9. hoist
- 2.10. Gantry
- 2.11. Cable crane

3. Concrete mixing station and transportation equipment	4
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- 3.1. Understand concrete construction equipment
- 3.2. Prestressed construction equipment
- 3.3. Common machines and equipment

4. Culvert	4
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- 4.1. Understand culvert construction preparation
- 4.2. Understand various types of culvert construction techniques

4.3. Culvert auxiliary works construction

5. **Bridge foundation** 4

- 5.1. Importance of bridge foundation construction
- 5.2. General form of bridge foundation construction
- 5.3. Main methods of bridge foundation construction
- 5.4. Preparatory work before bridge foundation construction
- 5.5. Open cut to expand foundation construction
- 5.6. Pile foundation construction
- 5.7. Combined foundation construction

6. **Bridge pier and abutment** 4

- 6.1. Construction procedures
- 6.2. Construction essentials
- 6.3. Road drainage
- 6.4. Construction of concrete pier
- 6.5. Construction of masonry pier
- 6.6. Assembly pier construction
- 6.7. Sliding formwork construction
- 6.8. Abutment accessory works

7. **Construction support and formwork** 4

- 7.1. Cast-in-place construction
- 7.2. Construction of fabricated bridge
- 7.3. Support type and structure
- 7.4. Construction pre-camber

8. **Concrete works** 4

- 8.1. Road intersections and their types.
- 8.2. Reinforcement frame installation
- 8.3. Concrete works
- 8.4. Concrete mix ratio
- 8.5. Concrete vibration

9. **Component transfer and transportation** 4

- 9.1. Preparation of component transfer and transport label
- 9.2. Matters needing attention
- 9.3. Installation method of prefabricated Bridges

10. **Construction technology of prestressed bridge** 4

- 10.1. Prestressing by pretension
- 10.2. Post-tensioning prestress

11. **Hole by hole erection method** 4

11.1.	Construction technology of hole by hole erection method	
12.	Movable die frame method	2
12.1.	Construction technology of mobile formwork	
13.	Cantilever casting method	2
13.1.	Cantilever casting construction technology	
14.	The arch	2
14.1.	Cast-in-place construction	
14.2.	Cantilever casting construction	
14.3.	Assembly construction	
14.4.	Construction of steel pipe arches	
14.5.	Construction by turning method	
15.	Cable-stayed bridge construction	4
15.1.	Construction technology of cable-stayed bridge	
16.	Suspension bridge	4
16.1.	Construction technology of suspension bridge	
17.	The expansion joints	4
17.1.	Basic concepts and classification of expansion joints	
17.2.	Installation of expansion joints	
18.	Bridge deck paving	2
18.1.	Construction of reinforced concrete bridge deck pavement	
18.2.	Asphalt concrete layer construction	
19.	Other ancillary works	2
19.1.	The pavement	
19.2.	Bridge deck protection	
19.3.	The drain pipe	
19.4.	Lamp post support	
19.5.	Bridge deck is waterproof	
19.6.	bridge end transition slab	

Recommended / Reference Books:

1. Bridge and Culvert Construction Technology, Li Ling, China Machine Press,

2019

2. Technical Specifications for Construction of Highway Bridges and Culverts JTG/TF50-2011
3. Civil Engineering Network www.civil.cn.com
4. Cnki www.cnki.net
5. Build dragon net www.zhulong.com
6. Chinese Steel Structure Forum okok.org

Instructional Objectives

1. Master bridge and culvert construction preparation
2. Understand lifting equipment
3. Understand the vibration equipment of concrete
4. Understand the classification and characteristics of culverts
5. Understand the classification and characteristics of culverts
6. Master the types of open-cut foundation construction
7. Master the construction of bored pile
8. Master the double-arm steel cofferdam and bored pile foundation
9. Master the construction procedure of concrete pier
10. Master the construction method of prefabricated concrete
11. Master sliding template construction and lifting process
12. Master the bracket type, structure and construction pre-camber
13. Master the calculation of concrete mix ratio
14. Master the installation method of prefabricated Bridges
15. Master the construction technology of prestressed girder bridge with tensioning method
16. Master the construction technology of post-tensioned prestressed girder bridge
17. Understand stent form
18. Understand construction methods
19. Know construction procedures and can distinguish
20. Master the construction method of arch bridge with supports
21. Master the assembling construction method of arch bridge
22. Master the construction method of stay cable
23. Master the construction method of suspension bridge
24. Master the installation of expansion joints
25. Understand the experiments used during construction
26. Understand the characteristics of ancillary construction

List Of Practicals

Hours

- | | | |
|---|---|---|
| 1 | Prepare construction preparations | 2 |
| 2 | Prepare construction organization design | 6 |
| 3 | Bridge expansion foundation construction process | 8 |
| 4 | Common problems and solutions in bridge foundation construction | 8 |
| 5 | Bridge pile foundation construction process | 8 |

6	Common problems and solutions in bridge pile foundation construction	8
7	Bridge pier construction process	8
8	Common problems and solutions in bridge pier construction	8
9	The construction process of simply supported beam bridge construction	8
10	Construction process of continuous beam bridge construction	8
11	Construction process of other system beam bridge construction	8
12	Bridge deck is the construction process of construction	8
13	Construction process of culvert construction	8

DAE civil technology YEAR 3					
0801259	Highway construction organization plan				
TOTAL HOURS:	CONTACT	128	T	P	C
Theory:		32	1	3	2
Practice:		96			
GOAL:	Enable students to: 1. Understand the construction organization and design related documents of each stage in the process of highway capital construction; 2. Master the basic theory of construction process organization principle and network planning technology 3. Master highway engineering construction organization design, mechanization construction organization design; 4. Proficient in the application of construction plan, construction method optimization comparison and time organization, space organization, resource organization				

COURSE CONTENTS	Hours
1. Introduction to highway construction organization	4
1.1 Highway construction	
1.2 Construction organization and management	
1.3 The function and classification	

of Highway
construction
organization
plan.

1.4 The
composition,
nature, content
and scale of
highway
engineering
capital
construction

1.5 The research
object and task
of construction
procedure and
construction
organization in
each stage of
highway
construction

2. Principle of construct ion process organizat ion

6

2.1 The
organization
principle of
construction
process, the
division of
construction
process

2.2 Time
organization
of the
construction
process

2.3 Construction
methods of

- engineering projects include sequential operation, parallel operation and flow operation;
- 2.4 Calculate the total construction period of flow water

3. **Network planning technique**

8

- 3.1 Fundamentals of network planning techniques
- 3.2 Network Planning Features
- 3.3 Classification of network plans
- 3.4 Composition of the network plan diagram
- 3.5 Double code network plan diagram
- 3.6 Single code network plan diagram
- 3.7 Network scheduling time optimization
- 3.8 Network planning time

- cost optimization
- 3.9 Resource optimization for network planning
- 4. **Highway engineering construction organization design**
- 4.1 Compiling the basic principles of construction organization design
- 4.2 Classification and document composition of construction organization design
- 4.3 Compile the procedure of construction organization design
- 4.4 Main influencing factors of construction scheme
- 4.5 Selection of overall construction scheme and construction method
- 4.6 The role of

construction
schedule

4.7 The basis and
steps of the
construction
schedule

4.8 Be familiar
with the form
of construction
progress chart

**5. Mechaniz
ed
construct
ion
organizat
ion
design**

6

5.1 Overall design
of mechanical
construction

5.2 Highway
engineering
main
construction
machinery

5.3 Mechanical
modeling and
supporting
operations

Recommended/R
eference
books:

1. Highway
constructi
on
organizati
on plan
(3rd
edition).

Cao
Shengyu,
people's
Communi
cations
Publishin
g house

INSTRUCTION

AL

OBJECTIV

ES

1. **Introducti **on to** **highway** **construct** **ion** **organizat** **ion****

- 1.1 Be familiar with the content of highway construction, master several characteristics of highway construction;
- 1.2 Understand the development and modernization of construction organization management;
- 1.3 Be familiar with the function and

classification
of Highway
construction
organization
plan.

- 1.4 Understand
the
composition,
nature, content
and scale of
highway
engineering
capital
construction
- 1.5 Be familiar
with the
construction
procedure of
each stage of
highway
construction
- 1.6 Be familiar
with the
research object
and task of
highway
construction
organization

2. Principle of construct ion process organizat ion

- 2.1 Understand
construction
process
organization
principle,
construction
process
division

- 2.2 Be familiar with highway construction process composition
- 2.3 Be Be familiar with the time organization of the construction process
- 2.4 Master the construction sequence of two processes and multiple tasks, master the construction sequence of three processes and multiple tasks.
- 2.5 Master the construction methods of engineering projects, including sequential operation, parallel operation and flow operation;
- 2.6 Master the characteristics of flow construction;
- 2.7 Master the main parameters of flow line operation.

2.8 Be familiar
with the types
of flow
construction

2.9 Master the
characteristics
and
application of
congruent
rhythm flow,
multiple
rhythm flow,
separate flow,
no rhythm
flow

2.10 Master the
calculation of
the total
construction
period of
water flow

3. Network planning technique e

3.1 Be familiar
with the basic
principles of
network
planning
techniques

3.2 Master
network
planning
features

3.3 Be Be familiar
with the
classification
of network
plans

3.4 Understand
the
composition

of the network
plan diagram

- 3.5 Learn about
the double
code network
plan diagram
- 3.6 Be familiar
with drawing
rules of double
code network
graph
- 3.7 Master the
drawing of
double code
network
diagram
- 3.8 Master time
parameter
calculation
and key circuit
- 3.9 Be familiar
with the
concept and
characteristics
of time
coordinate
network
planning
- 3.10 Be familiar
with the
application of
coordinate
network
planning
- 3.11 Master the
drawing of
time
coordinate
network plan
- 3.12 Master the
drawing rules
of single code
network plan
diagram

3.13 Master time
parameter
calculation of
single code
network plan
drawing

3.14 Master
network
scheduling
optimization

3.15 Master the
time - cost
optimization
of network
planning

3.16 Master the
resource
optimization
of network
planning

4. Highway engineeri ng construct ion organizat ion design

4.1 Be familiar
with the basic
principles of
construction
organization
design

4.2 Be familiar
with the
classification
and document
composition
of construction
organization
design

4.3 Master the

procedures of
construction
organization
design

4.4 Be familiar
with the main
influencing
factors of
construction
scheme

4.5 Master the
selection of
overall
construction
plan and
construction
method

4.6 Be Be familiar
with the
function of
construction
schedule

4.7 Master the
basis and steps
of construction
schedule

4.8 Be familiar
with the form
of construction
progress chart

4.9 Master the
preparation of
construction
schedule

**5. Mechaniz
ed
construct
ion
organizat
ion
design**

5.1 Understand
the general
design of

- mechanical
construction
- 5.2 Be familiar
with main
construction
machinery of
highway
engineering
- 5.3 Be familiar
with
mechanical
modeling and
supporting
operations

LIST OF PRACTICALS		Hours
1	Calculate the total construction period of flow water	12
2	Draw a single code network plan map	12
3	Draw the double code network plan map	14
4	Network scheduling time optimization	14
5	Time - cost optimization for network planning	14
6	Resource optimization for network planning	14
7	Compile construction	16

organization
design

DAE civil technology
YEAR 3

0801239

Highway engineering measurement and valuation

TOTAL CONTACT HOURS:	128	T	P	C
Theory:	32	1	3	2
Practice:	96			

GOAL: Enable students to:

1. Be able to calculate quantities according to construction drawings and corresponding construction plans;
2. Be able to make reasonable material consumption plan according to project schedule and actual situation and quota;
3. Master the basis and method of engineering measurement and payment;
4. Can correctly use highway engineering metrology rules to complete the compilation of intermediate metrology;
5. Will calculate the project settlement and project change cost;
6. Be able to prepare monthly measurement and payment statements.

COURSE CONTENTS	Hours
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1. Bill of quantities

4

1.1 Knowledge of bill of quantities

1.2 Preparation of bill of quantities

2. Highway engineering metrology

4

2.1 Measurement principle and scope

2.2 Content, time, method and method of measurement

2.3 Detailed rules for highway engineering measurement

3. Quantity calculation

4

3.1 Calculation of roadbed quantity

3.2 Engineering quantity calculation of common engineering structures

4. Calculate the average distance of material

4

4.1 Determination of material average distance

5. Subgrade and pavement list measurement rules and application

4

5.1 Roadbed earthwork measurement

5.2 Soft soil foundation treatment measurement

5.3 Pavement metrology

5.4 Subgrade and pavement drainage engineering measurement

6. Bridge list measurement rules and application

4

6.1 Measurement of abutment and foundation engineering of a small bridge

7. Measurement and payment

4

7.1 Measurement report

7.2 Project payment

8. Bridge measurement

4

8.1 Complete the accounting and measurement of the whole bridge quantity

Recommended/Reference books:

1. Highway Engineering Metrology and Valuation, Xin Jianli, Science Press

INSTRUCTIONAL OBJECTIVES

1. Bill of quantities

- 1.1 Learn and understand the meaning of the bill of quantities
- 1.2 Understand the relationship between bill of quantities and bidding
- 1.3 Learn the role of the bill of quantities
- 1.4 Learn how to write a bill of quantities
- 1.5 Be able to read and understand the preparation case of bill of quantities

2. Highway engineering metrology

- 2.1 Describe the concept, principle, method and procedure of highway engineering measurement
- 2.2 Understand the general rules of measurement
- 2.3 Be familiar with highway engineering measurement rules of various majors
- 2.4 Understand measurement methods and procedures
- 2.5 Distinguish the supervision and construction of the respective responsibilities in the measurement work

3. Quantity calculation

- 3.1 Learn and understand the meaning of quantity
- 3.2 Learn the principle of engineering quantity measurement of roadbed, pavement and bridge and culvert structures
- 3.3 Be familiar with calculation formula of engineering structure quantity
- 3.4 Be able to measure quantities according to construction drawings

4. Calculate the average distance of material

- 4.1 Learn and understand the scope of economic supply of materials
- 4.2 Learn to calculate the average distance of materials

5. Subgrade and pavement list measurement rules and application

- 5.1 Learn the measurement method of subgrade engineering
- 5.2 Learn pavement engineering measurement methods
- 5.3 Learn and understand subgrade checklist measurement rules
- 5.4 Learn the detailed rules and application of pavement list measurement
- 5.5 Can correctly use the subgrade and pavement list measurement rules to complete the actual engineering subgrade and pavement measurement

6. Bridge list measurement rules and application

- 6.1 Learn and understand the detailed rules of bridge reinforcement and concrete engineering
- 6.2 To complete the measurement of reinforced concrete engineering of bridge structure

7. Measurement and payment

- 7.1 Be able to know the types of measured payments and the composition of payment statements
- 7.2 Learn the preparation method of measurement payment monthly statement

8. Bridge measurement

- 8.1 Be able to complete the accounting of the main engineering quantity of the whole bridge according to the construction drawings

LIST OF PRACTICALS		Hours
1.	Learn the bill of quantities for the actual project	10
2.	Complete a specific task of quantity calculation	14
3.	According to the construction situation, determine the average distance of materials	14
4.	Take the actual project as an example to complete the measurement of the corresponding part of roadbed and pavement in the list	14
5.	Take the actual project as an example, complete the measurement of the corresponding part of the bridge reinforcement and concrete engineering in the list	16
6.	To understand the relationship between measurement and valuation with a case study of a real project	
7.	According to a complete bridge construction drawing, complete the measurement of all quantities of the bridge within the specified time in accordance with the list of measurement rules	

DAE civil technology					
In the third year					
0801249	Highway and bridge inspection technology				

TOTAL CONTACT HOURS:	128	T	P	C
Theory:	32	1	3	2
Practice:	96			

- GOAL:** Enable students to:
1. Master the test method of subgrade and pavement geometry and thickness.
 2. Master roadbed and pavement compactness detection method.
 3. Master the road roughness testing method.
 4. Master the test method of skid resistance of pavement.
 5. Master the test method of subgrade pavement strength index.
 6. Understand the integrity test method of concrete bored pile and structural concrete strength test method.
 7. Understand the processing method of test data.

COURSE CONTENTS	Hours
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1. An introduction to	2
1.1 The purpose and significance of the test;	
1.2 Method for quality inspection and assessment of highway engineering	
2. Test and test data processing	2
2.1 The basic concept of error;	
2.2 Significant figures and digital modifications;	
2.3 Statistical characteristics and distribution of data;	
2.4 Questionable data selection method;	
2.5 Correlation graphs and regression analysis	
3. Test the geometric dimension and thickness of roadbed and pavement	4
3.1 Random point selection method for road subgrade and pavement field test	
3.2 Test the geometric dimension of roadbed and pavement	
3.3 Pavement thickness detection	
4. Compactness test of roadbed and pavement	4
4.1 Field compaction degree test of sand filling method	
4.2 Compactness test on site by ring knife method	
4.3 Compactness test of nucleometer on site	
4.4 Compaction degree of asphalt surface is measured by drilling core method	
4.5 Compactness evaluation method	

5. Pavement flatness detection	4
5.1 3m ruler to measure flatness	
5.2 The continuous flatness meter measures the flatness	
5.3 New flatness detection technology	
6. Road skid resistance test	4
6.1 Depth detection of pavement structure	
6.2 Road friction coefficient detection	
7. Test the strength index of roadbed and pavement	4
7.1 Detection of roadbed and pavement rebound bending	
7.2 Detection of roadbed and pavement rebound modulus	
7.3 Load ratio detection	
8. Integrity test of concrete bored pile	4
8.1 Construction process inspection	
8.2 Concrete drilling (digging) hole filling pile detection	
9. Structural concrete strength testing	4
9.1 Test the compressive strength of cement concrete by rebound method	
9.2 Determination of concrete strength by drilling and coring	
9.3 Quality inspection of welded steel bar	

Recommended/Reference books:

1. Highway and Bridge Detection Technology, Zhou Dejun, People's Communications Publishing House

INSTRUCTIONAL OBJECTIVES

1. An introduction to

- 1.1 Understand the purpose and significance of test
- 1.2 Master the quality grading, relevant regulations and methods of sub-project, sub-project and unit project

2. Test and test data processing

- 2.1 Understand the basic concepts of error
- 2.2 Master the rules of digital modification
- 2.3 It can calculate the representative value of test data by using data normal distribution and T distribution law

3. Test the geometric dimension and thickness of roadbed and pavement

- 3.1 Understand the random selection method of field test
- 3.2 Master the detection method and matters needing attention of subgrade and pavement geometry and thickness

4. Compactness test of roadbed and pavement

- 4.1 Master sand filling method, ring knife method to determine the compaction degree of subgrade or pavement base
- 4.2 Be able to calculate and evaluate test results
- 4.3 Understand the core drilling method to determine the compaction degree of asphalt surface

5. Pavement flatness detection

- 5.1 Master the method of measuring flatness with 3m ruler
- 5.2 To understand the method and new technology of measuring flatness by continuous flatness tester

6. Road skid resistance test

- 6.1 Master manual sand paving method and pendulum measuring method of road friction coefficient
- 6.2 Understand laser structure depth meter, automatic sand paving meter and pavement transverse force coefficient detection method

7. Test the strength index of roadbed and pavement

- 7.1 Master the method of measuring the rebound bending value of roadbed and pavement with Beckman beam bending instrument
- 7.2 Representative deflection values will be calculated to evaluate the results
- 7.3 Master the detection method of roadbed and pavement rebound modulus and load-bearing ratio;
- 7.4 To understand the method of measuring road surface bending with automatic bending instrument and drop hammer bending instrument

8. Integrity test of concrete bored pile

- 8.1 Understand the detection content of bored pile construction process
- 8.2 Testing standard for pore-forming quality
- 8.3 Steps for inspecting pile integrity by low strain stress reflection wave method
- 8.4 Can interpret the general measured defect waveform

9. Structural concrete strength testing

- 9.1 To understand the principle of measuring the compressive strength of cement concrete with rebound instrument
- 9.2 Master the method of measuring the rebound value of structural concrete with rebound meter

LIST OF PRACTICALS		Hours
1	Test the geometric dimension and thickness of roadbed and pavement	12
2	Compactness test of roadbed and pavement	14
3	Pavement flatness detection	14
4	Road skid resistance test	14
5	Test the strength index of roadbed and pavement	14
6	Integrity test of concrete bored pile	14
7	Structural concrete strength testing	14

DAE civil technology

In the third year

0801581	Highway maintenance and management			
TOTAL CONTACT HOURS:	128	T	P	C
Theory:	32	1	3	2
Practice:	96			

GOAL: Enable students to:

1. Highway maintenance assessment will be carried out;
2. Will carry out daily maintenance and related management work;
3. Highway maintenance and related management;
4. Can carry out highway reinforcement work.

COURSE CONTENTS	Hours
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1. The subgrade maintenance

8

- 1.1 Roadbed assessment and maintenance, maintenance and reinforcement
- 1.2 Investigation and evaluation of roadbed condition
- 1.3 Roadbed maintenance
- 1.4 Special maintenance of roadbed
- 1.5 Roadbed overhaul project

2. Pavement maintenance

8

- 2.1 Pavement assessment and maintenance, maintenance and reinforcement
- 2.2 Survey and evaluation of pavement condition
- 2.3 Pavement maintenance
- 2.4 Special pavement maintenance
- 2.5 Road surface overhaul works

3. Bridge maintenance

8

- 3.1 Bridge and culvert assessment and maintenance, maintenance and reinforcement
- 3.2 Survey and evaluation of bridge and culvert condition
- 3.3 Bridge and culvert maintenance
- 3.4 Special maintenance of Bridges and culverts
- 3.5 Bridge and culvert overhaul project

4. Maintenance of facilities along the line

8

- 4.1 Assessment, maintenance, maintenance and reinforcement of facilities along the line
- 4.2 Survey and evaluation of facilities along the line
- 4.3 Maintenance of facilities along the line

4.4 Special maintenance of facilities along the route

4.5 Overhaul of facilities along the line

Recommended/Reference books:

1. Road and bridge Maintenance Technology, Wang Zhile, China Machine Press
2. Highway Maintenance (2nd Ed.), Shen Yandong, Beijing Institute of Technology Press

INSTRUCTIONAL OBJECTIVES

1. The subgrade maintenance

- 1.1 A roadbed technical condition survey will be conducted
- 1.2 The technical condition of roadbed will be assessed

2. Pavement maintenance

- 2.1 A road condition survey will be conducted
- 2.2 The technical condition of the road surface will be assessed

3. Bridge maintenance

- 3.1 The bridge and culvert technical condition survey will be conducted
- 3.2 Bridge and culvert technical condition assessment will be carried out

4. Maintenance of facilities along the line

- 4.1 A survey will be conducted on the technical conditions of facilities along the route
- 4.2 The technical status of facilities along the route will be assessed

LIST OF PRACTICALS

Hours

1. The subgrade maintenance

24

- 1.1 Repair kerb, slope, trim kerb weeds, remove debris in retaining wall, slope protection, guardrail, well and drainage trough
- 1.2 Dredge gutter and repair kerb
- 1.3 Small sections of excavation, paving edge ditch
- 1.4 Clear roadbed cave-ins and fill gaps
- 1.5 Partial repair retaining wall, slope protection, drainage groove masonry
- 1.6 Reinforce the shoulder
- 1.7 Comprehensive repair of retaining walls, slope protection, gutters, side ditches and kerbs

- 1.8 Clear large landslide, treatment of large area pulp
- 1.9 The whole section of additional edge ditch, cut ditch
- 1.10 Partial soft soil foundation treatment
- 1.11 Demolish, rebuild or increase larger retaining wall, slope protection and other protective works
- 1.12 Rehabilitation of roadbed damaged by major floods
- 1.13 The whole section of soft soil foundation treatment

2. Pavement maintenance

24

- 2.1 Clear the road of all debris
- 2.2 Discharge water, snow, ice accumulation, spread anti-skid, anti-freeze materials
- 2.3 Normal maintenance of cement concrete pavement joints
- 2.4 Treatment of asphalt pavement and cement concrete pavement local, slight disease
- 2.5 Routine inspection and regular investigation
- 2.6 To deal with serious road diseases
- 2.7 The whole surface of asphalt pavement
- 2.8 Handle bridge jumping
- 2.9 Periodic or preventive improvement works for whole sections of road surface
- 2.10 The whole section of black road surface plus pavement layer
- 2.11 Cement concrete pavement board whole replacement or improvement
- 2.12 Repair of road surface damage caused by major natural disasters

3. Bridge maintenance

24

- 3.1 Remove sludge, snow, debris, and keep the structure clean
- 3.2 Remove sludge debris under overpasses and tunnel passages
- 3.3 Expansion joint cleaning and dressing, drainage tank dredging, part of the railing paint
- 3.4 Partial replacement of railings, handrails and other small components
- 3.5 Local repair of drainage gutters, expansion joints, supports and deck
- 3.6 Maintenance and protection works
- 3.7 Culvert repair and dredging
- 3.8 Replace the expansion joint and support
- 3.9 Partial repair of pier, abutment and tunnel lining
- 3.10 Bridge riverbed paving and repair of regulating structures
- 3.11 Complete repair or renewal of drainage facilities
- 3.12 Load-carrying capacity detection
- 3.13 Metal construction comprehensive rust removal, paint
- 3.14 Add small three-dimensional crossings or passageways
- 3.15 Improve the whole section of the bridge
- 3.16 Comprehensive improvement of tunnel lining

4. Maintenance of facilities along the line

24

- 4.1 Normal maintenance and regular inspection of marks, lines, catchment Wells, communication Wells and other facilities
- 4.2 Guardrail, isolation grating good sign local paint and replacement
- 4.3 Partial repair of road marking
- 4.4 Comprehensive repair of guardrail, barrier and signs
- 4.5 The whole section of the road was remarked
- 4.6 The entire steel facility along the line is regularly painted
- 4.7 Communication and monitoring facilities repair
- 4.8 Replace the facilities along the whole section

DAE CIVIL TECHNOLOGY
YEAR 3

0801959

Application of BIM Technology

TOTAL CONTACT HOURS:	128	T	P	C
Theory:	32	1	3	2
Practical:	96			

After completing the course the students will be able to

AIM: 5. Various models and related information generated in the design and construction of architectural engineering are made into BIM and related 2D engineering drawings, 3D geometric models and other related graphics, models and documents required for engineering design, construction and subsequent applications

Course Contents	Hours
1. Case 1: Small villa case 1.1. Understanding of project-level modeling standards and construction drawings; 1.2. Basic concepts and operations of BIM modeling software (modeling environment setting, project setting, coordinate system definition, elevation and axis network drawing, command and data input, etc.); 1.3. Selection of benchmark samples; 1.4. Basic drawing method of column beam plate; 1.5. Basic drawing methods of internal and external walls, doors and Windows, and entrances; 1.6. Curtain wall drawing method; 1.7. Create stairs; 1.8. Other auxiliary components and site layout creation methods 1.9. Create construction drawings. 1.10. Master the method of creating a detailed list; 1.11. Master drawing creation methods, including frame, model based flat, vertical, profile, 3D view, form, etc. 1.12. Master the basic methods of view rendering and creating roaming animation; 1.13. Master model file management and data conversion methods.	16
2. Case 2: Creating a family 2.1. Create a tag family; 2.2. Create column families, door families, and window families and place them in the project. 2.3. Conceptual volume	8
3. Special exercises for BIM grade examination 3.1. Theoretical knowledge 3.2. Building single component model 3.3. Loadable family 3.4. The built-in clan	8

- 3.5. Conceptual volume
- 3.6. Comprehensive exercises

Recommended / Reference Books:

1. Revit Architectural Modeling Training, Wang Xianfeng, China Architecture and Building Press, 2017;
2. Revit Design Manual, Ping Jing wei, China Machine Press, 2016.

Instructional Objectives

1. Familiar with basic interface of Revit software;
2. Master revit drawing commands and usage methods;
3. Master revit modification commands and usage methods;
4. Master national drawing standards and draw construction drawings
5. Be able to correctly and skillfully select and apply Revit software to draw structural models;
6. Able to use Revit software to complete the establishment and measurement of steel bar models;
7. Be able to print drawings skillfully.

List Of Practicals	Hours
1. Case 1: Small villa case 1.1.Understanding of project-level modeling standards and construction drawings; 1.2.Basic operations of BIM modeling software (modeling environment setting, project setting, coordinate system definition, elevation and axis network drawing, command and data input, etc.); 1.3.Drawing of column beam and plate; 1.4.Interior and exterior walls, doors and Windows, and openings; 1.5.Curtain wall drawing method; 1.6.Create stairs. 1.7.Create other auxiliary components and site layout 1.8.Create construction drawings 1.9.Create a list; 1.10. Methods of creating drawings, including frame, model based flat, vertical, section, 3D view, form, etc. 1.11. View rendering 1.12. Create roaming animation 1.13. Model file management and data conversion.	32
2. Case 2: Creating a family	32

- 2.1. Create a tag family;
 - 2.2. Create column families, door families, and window families and place them in the project.
 - 2.3. Conceptual volume
 - 2.4. Create a tag family;
 - 2.5. Create column families, door families and window families and place them in the project.
- 3. Special exercises for BIM grade examination 32
 - 3.1. Building single component model
 - 3.2. Load the clan
 - 3.3. The built-in clan
 - 3.4. Comprehensive exercises

LIST OF LABORATORIES SUBJECT WISE

SUBJECT TITLE	NAME OF LABORATORY / WORKSHOP
Applied Chemistry	Chemistry Laboratory
Applied Physics	Physics Laboratory
Basic Civil Engineering Surveying Road Survey And Design Highway Construction Organization Plan Highway Engineering Measurement And Valuation	Surveying Laboratory
Basic Civil Engineering Drawing Road Engineering Drawing, Drawing Recognition & Auto CAD	Drafting Laboratory
Computer Applications Road Engineering Drawing, Drawing Recognition & Auto CAD Highway Construction Organization Plan	AutoCAD Laboratory
Computer Applications Highway Engineering Measurement And Valuation Highway Construction Organization Plan	Computer Laboratory
Road Engineering Materials Advanced Construction Techniques	Construction Laboratory
Engineering Mechanics Road Engineering Materials Soil Mechanics And Foundation Engineering Highway Construction Organization Plan	Materials Testing Laboratory (Combination of Soil Mechanics Lab, Mechanics Lab, Transportation Lab and Concrete Lab)
Public Health Technology	Public Health Lab
Application of BIM technology	BIM Laboratory

NAMES OF REVISION COMMITTEE MEMBERS

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Recommendations by TEVTA Curriculum Review Committee for DAE Civil

- The task for reviewing the following subjects may be assigned to the experts having relevant qualification as per the requirements of further education awarding bodies:
 - Islamiat and Pakistan Studies
 - English
 - Applied Mathematic-I and II
 - Applied Chemistry
 - Applied Physics
- Merging of the subjects of Civil 332 Environmental Technology and Civil 371 Occupational Health and Safety Environment is suggested and renamed as “Civil 332 Environment, Health and Safety” and experts may be hired for its further improvement.
- New subject Civil 271 Entrepreneurship is introduced to create concept of self-employability in students and encourage them for the purpose.
- Primavera P6 is included in Civil 312 Project Management. Also Project is also merged in this subject with a new name as Civil 314 Construction Project Planning & Management.
- New topics in Construction, Mechanics, and Transportation etc. have been added as per the need of the construction industry.
- To reduce the cost of infrastructure, some labs have been merged in to a single one. But separate labs are necessary where more than 4 groups of students are enrolled in a single shift.

7. Technical teachers are eligible to teach civil related subjects with relevant computer course e.g. AutoCAD, AutoCAD Civil 3D, Primavera, 3D Max.