

# Bachelor of Engineering Quantity Surveying and Cost Engineering



# **Bachelor of Engineering – Quantity Surveying** and Cost Engineering

# MISSION STATEMENT

The Bachelor of Engineering in Quantity Surveying and Cost Engineering program at Springfield Research University (SRU) is committed to developing skilled professionals who excel in managing financial aspects of construction projects. Through rigorous academic standards, practical training, and ethical leadership, our graduates contribute to the efficient use of resources, cost-effective project delivery, and sustainable development.

Our mission is built upon three core pillars:

#### 1. Academic Excellence:

- We maintain high standards, fostering critical thinking and intellectual growth.
- Students engage in coursework, practical exercises, and evidence-based practices to excel in the complex field of quantity surveying and cost engineering.
- They gain a solid foundation in construction economics, cost estimation, and project management.

#### 2. Cutting-Edge Research:

- Our faculty and students actively contribute to advancing cost engineering practices.
- By addressing real-world challenges, exploring innovative cost management concepts, and shaping industry practices, we drive positive change within the field.
- Students participate in research projects, simulations, and experiments, enhancing their ability to provide cost-effective solutions.

# 3. Societal Impact:

- We recognize our responsibility to society and the environment.
- Graduates are not only skilled engineers but also ethical leaders who advocate for safety, sustainability, and global connectivity.
- They make meaningful contributions to construction projects, infrastructure development, and economic growth.

The Bachelor of Engineering in Quantity Surveying and Cost Engineering program prepares graduates for productive careers and responsible citizenship. Our focus is primarily on equipping students to design and manage cost-effective construction projects. Here's how we achieve this:

# 1. Foundational Knowledge:

 Students delve into core subjects such as construction law, cost modeling, and project economics. • These foundational principles provide essential groundwork for understanding cost estimation, procurement, and project control.

# 2. Applied Learning:

- Lectures and practical sessions correlate theoretical knowledge with real-world construction scenarios.
- For instance, students learn about cost management techniques and immediately apply them during hands-on exercises related to project budgets and financial planning.

# 3. Case-Based Approach:

- Real-world construction cases serve as powerful teaching tools.
- Students analyze project requirements, design specifications, and contractual considerations, bridging theory and practice.

# 4. Industry Collaborations and Internships:

- During industry placements and internships, students work directly with construction professionals.
- They apply theoretical knowledge in managing project costs, contracts, and financial resources.

#### 5. Cutting-Edge Practices:

- Students critically evaluate industry best practices, explore emerging technologies, and contribute to advancements in cost engineering.
- This integration of evidence-based approaches ensures that knowledge aligns with current industry standards.

By seamlessly weaving theory, practical experiences, and evidence-based approaches, our program prepares graduates to contribute effectively to the dynamic field of quantity surveying and cost engineering. They are involved in the construction process from the feasibility stage to post-completion, and they manage and administer construction costs and contracts for a variety of levels and types of construction. Tasks may include preparing cost plans and estimates, bills of quantities, tender appraisals, valuations, project audits, property taxation, and life cycle cost advise.

# RATIONALE FOR THE BACHELOR OF ENGINEERING IN QUANTITY SURVEYING AND COST ENGINEERING

At Springfield Research University, our Bachelor of Engineering in Quantity Surveying and Cost Engineering program is meticulously designed to prepare students for impactful careers in managing construction project finances. Rooted in academic excellence, this program equips students with essential knowledge, practical skills, and hands-on experience. By emphasizing evidence-based practices and innovation, our graduates emerge as competent professionals poised to contribute to efficient resource utilization, cost-effective project delivery, and sustainable development.

# National Needs (Eswatini):

# 1. Quantitative Expertise:

- Eswatini demands skilled professionals who can navigate complex scenarios in cost estimation, project economics, and financial management.
- The program equips students with mathematical proficiency and critical thinking abilities to assess project costs effectively.

# 2. Cutting-Edge Practices:

- Graduates advocate for evidence-based decision-making, ensuring cost efficiency, safety, and equitable treatment in construction industries.
- By enhancing their understanding of construction economics, cost modeling, and project control, they contribute to better project outcomes.

# 3. Policy and Innovation:

• The program fosters critical thinking, enabling graduates to engage in research, policy formulation, and informed decision-making at the national level.

# Regional Needs (Southern African Development Community - SADC):

#### 1. Harmonization of Practices:

- SADC member states face common challenges in construction and infrastructure development.
- The program aligns with SADC's goal of harmonizing cost engineering frameworks, promoting cooperation, and advancing cost-effective practices.

# 2. Human Capital Development:

- Quantity surveyors play a pivotal role in regional industries, infrastructure projects, and economic growth.
- The program contributes to building a skilled workforce capable of addressing cross-border construction complexities.

#### 3. Technological Advancements:

- SADC's prosperity relies on informed cost engineering practices.
- Our graduates contribute to maintaining financial order in construction projects, resolving challenges, and fostering regional well-being.

# Purpose of the Program:

# 1. Technical Leadership:

- The program educates ethical leaders who champion evidence-based practices, fairness, and financial transparency in quantity surveying and cost engineering.
- Graduates not only assess cost data but also shape policies, regulations, and financial protocols.

# 2. Innovative Research:

• Students engage in specialized research, addressing contemporary cost engineering challenges and contributing to technological advancements.

# PROGRAM LEARNING OBJECTIVES

The Bachelor of Engineering in Quantity Surveying and Cost Engineering program at Springfield Research University is designed to prepare graduates with specialized skills and knowledge essential for successful careers in the construction industry. Our program focuses on equipping students with the following key objectives:

# 1. Effective Communication and Collaboration:

 Graduates will be proficient in interacting with other professionals within the construction industry. They will demonstrate strong communication skills, enabling effective collaboration with architects, engineers, contractors, and stakeholders.

# 2. Cost Assessment and Financial Expertise:

- Students will acquire the ability to independently assess and analyze capital and operating costs for construction projects.
- They will provide accurate and reliable cost estimates, considering factors such as materials, labor, equipment, and overhead expenses.

# 3. **Objective Decision-Making:**

- Graduates will approach cost assessment objectively, considering both quantitative and qualitative factors.
- They will make informed decisions related to project funding, investment feasibility, and financial control.

# 4. **Project Administration and Control:**

- Students will learn project management principles, including scheduling, budgeting, and resource allocation.
- They will apply effective control measures to ensure projects stay within budget and meet financial objectives.

# 5. Investment Analysis and Guidance:

- Graduates will be adept at analyzing investment opportunities in construction and infrastructure development.
- They will guide project owners, financiers, and contractors by providing insights into cost-effectiveness, risk assessment, and financial viability.

# 6. Ethical and Professional Practices:

- The program emphasizes ethical behavior, integrity, and transparency in cost engineering.
- Graduates will adhere to professional standards and contribute positively to the industry.

By achieving these learning objectives, our graduates will play a vital role in shaping the financial aspects of construction projects, contributing to sustainable development and efficient resource utilization.

# PROGRAM LEARNING OUTCOMES

Upon successful completion of the Bachelor of Engineering in Quantity Surveying and Cost Engineering program, graduates will:

# 1. **Provide Professional Advice:**

• Offer expert guidance to the construction industry regarding financial and legal aspects related to new constructions and the operation of existing buildings.

# 2. Cost Management and Contract Administration:

- Demonstrate proficiency in managing and administering construction costs and contracts.
- Perform tasks such as preparing bills of quantities, conducting tender appraisals, performing valuations, and conducting project audits.

#### 3. Building Management and Research Skills:

- Acquire knowledge in building management, cost planning, and building development research.
- Explore policy development, measurement techniques, and legal considerations relevant to the field.

# 4. **Practical Experience:**

• Gain hands-on experience through field trips, site visits, lab-based work, and industry placements.

By achieving these learning outcomes, graduates will be well-prepared to contribute effectively to the construction industry, ensuring efficient cost management and sustainable project development.

# ENTRY REQUIREMENTS

The student must have 6 passes in SGCE/GCE/IGCSE O' Level including a pass with Grade C or better in English Language and at least four other subjects. Special: Mathematics and any other two from Chemistry, Combined Science, Physics, Physical Science. Faculty may set mature entry requirements subject to approval by Senate.

# WORK INTEGRATE LEARNING

You are required to undertake 60 days of approved quantity surveying and cost engineering work experience as part of your Work Integrated Learning Core Unit.

# CAREER OPPORTUNITIES

Upon completing the Bachelor of Engineering in Quantity Surveying and Cost Engineering, graduates can explore a range of exciting career paths both locally and internationally:

# 1. Contact Administrator:

- Responsible for managing communication and administrative tasks related to construction projects.
- Opportunities exist within local and global organizations.

# 2. Estimator:

- Analyzes project requirements to estimate costs accurately.
- Graduates can work for construction firms worldwide, contributing to costeffective project planning.

#### 3. Project Manager:

- Leads and coordinates construction projects.
- International opportunities may arise, allowing graduates to manage diverse projects across borders.

## 4. Quantity Surveyor:

- Core role in cost engineering, handling contracts, valuations, and financial control.
- Graduates can work internationally, contributing to sustainable development and efficient resource utilization.

# 5. Consultancy and Advisory Roles:

- International consulting firms seek experts in cost engineering.
- o Graduates can provide advisory services on global construction projects.

#### 6. Infrastructure Development Agencies:

- Opportunities exist to work with international bodies on large-scale infrastructure projects.
- o Graduates contribute to global development initiatives.

# 7. Overseas Construction Projects:

- Gain valuable experience by participating in construction projects in different countries.
- o Adaptability and cultural awareness are essential for success.

#### 8. Research and Academia:

- International universities and research institutions offer positions for experts in cost engineering.
- Graduates can contribute to cutting-edge research and education.

Remember that embracing international opportunities requires openness, adaptability, and a passion for contributing to global progress.

# The Bachelor's Degree shall:

The Bachelor's degree program in Quantity Surveying and Cost Engineering at Springfield Research University is designed to equip students with the skills and knowledge necessary for a successful career in this dynamic field. Here are the key features of our program:

# 1. Duration:

• The program spans **four years** for full-time students or **six years** for part-time students, including an industrial attachment or internship period.

# 2. Semester Structure:

- Each academic year consists of two semesters.
- Semester Duration: Each semester runs for 20 weeks.
  - **Orientation Week**: One week dedicated to orientation.
  - **Teaching Weeks**: A minimum of **14 weeks** for instruction.
  - Mid-Semester Break: A one-week break for students.
  - **Examination Period**: Two weeks for final exams.
  - **Results Processing**: Two weeks allocated for marking and result processing.

Our program ensures a rigorous academic experience while allowing flexibility for part-time students. Students engage in hands-on learning, theoretical coursework, and practical projects, preparing them for the exciting challenges of the Quantity Surveying and Cost industry.

# Special Departmental Regulations

# 1. Course Completion Requirements:

- All Core, Prerequisite, Required, General, and Elective courses within the degree program are compulsory. Students must pass these courses with a minimum grade of 50% to graduate.
- However, during the third and fourth years, all courses must be passed with a minimum grade of **60%** (equivalent to a CGPA of **3.00**) to qualify for graduation.

# 2. Optional Courses:

• Optional courses do not contribute to the final grade. Their marks are excluded from the computation of the overall grade.

# 3. Externalization of Courses:

 All courses within the degree programs must be completed internally. Externalization is not permitted.

# 4. Quality Control and Evaluation:

 Regular academic audits and reviews occur every four years, overseen by external moderators. Internal program evaluation is ongoing.

# 5. Competence and Preparation:

• The courses offered in the Bachelor of Engineering in Quantity Surveying and Cost Engineering program provide adequate competences, preparing students for professional practice at the required academic level.

# 6. Core and Prerequisite Courses:

• Students must pass all Core and Prerequisite courses with a minimum grade of **50%** before progressing to the next level or enrolling in additional courses.

# **Degree Award and Classification**

- Upon successful completion of all Core, Required, and Education courses, as well as meeting the program requirements, a student will be awarded the degree of Bachelor of Engineering in Quantity Surveying and Cost Engineering at the end of the final year.
- The **normal classification** of a Bachelor's Degree is determined based on the academic performance during the third and fourth years of study.

# Rationale to Course Numbering

At Springfield Research University, we meticulously design our Quantity Surveying and Cost Engineering curriculum to empower students with the knowledge and skills needed to thrive in this dynamic field. Our course numbering system serves as a roadmap, guiding students through their academic journey - **\*\*100-level courses\*\*** introduce foundational concepts. - **\*\*200-level courses\*\*** build on those foundations. - **\*\*300-level courses\*\*** explore more specialized topics. - **\*\*400-level courses\*\*** are advanced and often include research or project components. Let's delve into the reasons behind our thoughtful approach:

- 1. **Logical Progression**: Our course numbers reflect a logical progression. Foundational concepts begin with the "100" series, followed by deeper explorations in the "200" and "300" levels. Advanced topics and research opportunities reside in the "400" series.
- 2. **Prerequisites and Coherence**: Clear numbering helps students understand prerequisites and co-requisites. For instance, a 200-level course assumes knowledge from related 100-level courses, ensuring a coherent learning experience.
- 3. **Specialization and Depth**: As students advance, higher-level courses delve into specialized areas such as control systems, surveying, and cost engineering. The numbering system communicates this depth of study.
- 4. Alignment with Program Goals: Each course number aligns with our program's learning outcomes. Whether it's mastering construction costs or diving into surveying techniques, students can track their progress.
- 5. **Transferability**: Consistent numbering facilitates credit transfer between institutions, supporting seamless academic mobility.

In summary, our course numbering isn't just a sequence—it's a deliberate framework that enhances learning, fosters curiosity, and prepares our students for impactful careers in Quantity Surveying and Cost engineering. Quantity Surveying and Cost Engineering courses simplifies the course numbering system.

- 1. 100-Level Courses:
  - **QSE 101:** Introduction to Quantity Surveying
  - **QSE 110:** Construction Materials and Methods
  - **QSE 120:** Cost Estimation and Budgeting
- 2. 200-Level Courses:
  - **QSE 201:** Measurement and Quantification
  - **QSE 210:** Contracts and Legal Aspects
  - **QSE 220:** Project Cost Control
- 3. 300-Level Courses:
  - **QSE 301:** Value Engineering and Life Cycle Costing
  - **QSE 310:** Risk Management in Construction
  - **QSE 320:** Sustainable Construction Practices
- 4. 400-Level Courses:
  - **QSE 401:** Advanced Cost Analysis
  - **QSE 410:** BIM and Quantity Surveying
  - **QSE 420**: Professional Practice and Ethics in QSE

The Bachelor of Engineering is a four (4) program. The student is expected to accumulate 576 credit points to be considered to have met the requirements of the Bachelor of Engineering in Quantity Surveying and Cost Engineering and must pass each module by at least 50%.

- Level 1 = minimum of credits 144 (1440 notional hours of study)
- Level 2 = minimum of credits 144 (1440 notional hours of study)
- Level 3 = minimum of credits 144 (1440 notional hours of study)
- Level 4 = minimum of credits 144 (1440 notional hours of study)

# TOTAL credit points 576 (5760 notional hours of study)

#### **Credit Transfer and Accumulation**

- 1. Credits are derived from engagement of students in learning activities during lectures, seminars, tutorials, micro or macro field trips, directed and self-directed learning and writing examination tests and assignments.
- 2. Modules from the engineering faculty are worth 12 credit. Lecture attendance is compulsory. Students who attend less than 80% of lessons will not be allowed to sit for their sessional examinations.

# Weighting

The degree class shall be based on weighting the results from part 1, 2, 3, and 4, the Degree weighting shall be as follows:

Level 1	20%
Level 2	20%
Level 3	30%
Level 4	30%

# **Distribution of Notional Hours**

Module	Lecture Hrs	Tutorials/ Seminars	Self- Directed Study	Assignment Tests/Exams	Notional Hrs	Credits
QSE000	36	24	30	30	120	12
PROJECT	0	0	60	60	120	12

#### ASSESSMENT METHODS

- 1. Formative Assessment (30%):
  - **Class Participation**: Actively engage in discussions, seminars, and practical activities related to quantity surveying and cost engineering.
  - **Quizzes and Short Tests**: Regular assessments on specific quantity surveying and cost engineering.
  - **Draft Assignments**: Receive feedback on early assignment drafts related to quantity surveying and cost engineering principles.
  - **Peer Review**: Collaborate with peers to review and improve each other's engineering project work.

# 2. Summative Assessment (60%):

- **Final Examinations**: Comprehensive exams covering course content specific to quantity surveying and cost engineering.
- **End-of-Semester Projects**: Assess students' knowledge and problem-solving skills related to quantity surveying and cost engineering challenges.
- **Oral Presentations**: Evaluate communication abilities within the context of quantity surveying and cost engineering solutions.
- **Engineering Design Competitions**: Simulate real-world quantity surveying and cost engineering scenarios.
- 3. Continuous Assessment (10%):

- Internships or Work Placements: Engage in supervised quantity surveying and cost engineering placements, applying theoretical knowledge to practical projects.
- Assignments and Projects: Regular tasks contribute to the overall grade, emphasizing practical skills in quantity surveying and cost engineering design and analysis.
- **Research Papers**: Demonstrate research abilities related to quantity surveying and cost engineering innovations and advancements.
- **Attendance and Active Participation**: Engage in lectures, workshops, and industry events specific to quantity surveying and cost engineering practices.

These adapted assessment methods align with Springfield Research University's commitment to academic excellence and the development of competent engineers.

# **Teaching Methods**

At Springfield Research University (SRU), we are committed to employing a diverse array of teaching methods to ensure a comprehensive and engaging learning experience for our students. Our teaching methods are carefully selected to align with the programme's objectives and to meet the needs of our diverse student body. The following are the key teaching methods utilized across all SRU programmes:

# 1. Lectures:

 Lectures are used to introduce and explain key concepts, theories, and principles. They provide a structured and systematic approach to delivering content, allowing students to gain a solid foundation in their respective fields. Lectures are often supplemented with visual aids, multimedia presentations, and interactive elements to enhance understanding and engagement.

# 2. Seminars:

• Seminars are interactive sessions that promote critical thinking and in-depth discussion on specific topics. Students are encouraged to actively participate, share their perspectives, and engage in debates. Seminars provide an opportunity for students to develop their analytical and communication skills.

# 3. Workshops:

 Workshops are hands-on sessions that focus on practical skills and applications. These sessions allow students to engage in experiential learning, apply theoretical knowledge to real-world scenarios, and collaborate with peers on projects and activities. Workshops are designed to foster creativity, problem-solving, and teamwork.

# 4. Problem-Based Learning (PBL):

 Problem-Based Learning is a student-centered approach that involves presenting students with complex, real-world problems to solve. Students work in small groups to research, discuss, and propose solutions, developing critical thinking and collaborative skills in the process. PBL encourages independent learning and active engagement.

# 5. Case Studies:

 Case studies are used to analyze real-life situations and decision-making processes. Students examine and discuss case studies to understand the context, identify key issues, and evaluate possible solutions. This method helps students develop their analytical and problem-solving abilities while relating theoretical concepts to practical situations.

# 6. Clinical Practice:

• For programmes that include a clinical component, such as Health and Medical Sciences, clinical practice is an integral part of the curriculum. Students gain handson experience in clinical settings, working under the supervision of qualified professionals. This method provides valuable opportunities for students to apply their knowledge, develop clinical skills, and gain insights into professional practice.

# 7. Research Projects:

 Research projects are designed to cultivate a culture of inquiry and innovation. Students engage in independent or group research projects, exploring topics of interest and contributing to the body of knowledge in their field. Research projects develop students' research skills, critical thinking, and ability to communicate findings effectively.

# 8. Online Learning:

 Online learning is incorporated to provide flexible and accessible education. SRU utilizes online platforms to deliver lectures, conduct discussions, and facilitate collaborative projects. Online learning allows students to access course materials, participate in virtual classrooms, and engage with peers and instructors remotely.

# 9. Continuous Assessment:

 Continuous assessment methods, such as quizzes, assignments, and presentations, are used to monitor students' progress and provide ongoing feedback. These assessments help identify areas for improvement and ensure that students are meeting learning objectives throughout the course.

# 10. Peer Learning:

• Peer learning encourages students to collaborate and learn from each other. Group projects, study groups, and peer review sessions provide opportunities for students to share knowledge, offer feedback, and support each other's learning journey.

At SRU, our commitment to employing diverse and effective teaching methods ensures that our students receive a well-rounded education that prepares them for success in their chosen fields. We continuously review and enhance our teaching practices to provide the best possible learning experience for our students.

# **Delivery Methods**

At Springfield Research University (SRU), we utilize a variety of delivery methods to ensure that our educational programmes are accessible, engaging, and effective. Our delivery methods are designed to cater to the diverse needs of our students and to provide flexible learning opportunities. The following are the key delivery methods employed across all SRU programmes:

# 1. In-Person Delivery:

- **Classroom Lectures:** Traditional classroom lectures provide a structured and interactive environment where students can engage with instructors and peers. These sessions often include discussions, presentations, and multimedia resources to enhance learning.
- Laboratory Sessions: For programmes that require practical and experimental learning, laboratory sessions are conducted in specialized labs equipped with the necessary tools and equipment. These hands-on sessions allow students to apply theoretical knowledge in a controlled environment.
- **Clinical Placements:** Health and Medical Sciences programmes include clinical placements in hospitals, clinics, and healthcare facilities. These placements provide students with real-world experience under the supervision of qualified professionals.

# 2. Online Delivery:

- Virtual Classrooms: Online platforms are used to deliver lectures, conduct discussions, and facilitate collaborative projects. Virtual classrooms enable students to access course materials, participate in live sessions, and engage with peers and instructors from remote locations.
- **Recorded Lectures:** Recorded lectures are made available for students to access at their convenience. This flexible approach allows students to review and revisit course content as needed.
- **Online Assessments:** Online assessments, including quizzes, assignments, and exams, are conducted through secure online platforms. These assessments provide timely feedback and help monitor students' progress.

# 3. Blended Learning:

- **Hybrid Courses:** Blended learning combines in-person and online delivery methods to provide a flexible and comprehensive learning experience. Hybrid courses may involve alternating between classroom sessions and online activities.
- Flipped Classroom: In the flipped classroom model, students access instructional content online before class and use in-person sessions for interactive, application-based activities. This approach encourages active learning and deeper engagement with the material.

# 4. Independent Study:

- **Self-Paced Learning:** Self-paced learning allows students to progress through course materials at their own speed. This method is ideal for students who prefer to learn independently and manage their own schedules.
- **Research Projects:** Independent research projects provide students with the opportunity to explore topics of interest, develop research skills, and contribute to the body of knowledge in their field. Faculty advisors provide guidance and support throughout the research process.

# 5. Collaborative Learning:

- **Group Projects:** Group projects foster teamwork and collaboration among students. These projects often involve problem-solving, research, and presentations, allowing students to learn from each other and develop interpersonal skills.
- **Peer Review:** Peer review sessions encourage students to provide and receive constructive feedback on each other's work. This method promotes critical thinking, reflection, and improvement.

# 6. Experiential Learning:

- Internships and Work Placements: Internships and work placements provide students with practical experience in their chosen field. These opportunities allow students to apply their knowledge in real-world settings, develop professional skills, and build industry connections.
- Field Trips and Excursions: Field trips and excursions offer experiential learning opportunities outside the classroom. These activities provide students with firsthand exposure to relevant sites, industries, and practices.

# 7. Continuous Assessment:

- Formative Assessments: Formative assessments, such as quizzes, assignments, and in-class activities, provide ongoing feedback to students and help track their progress. These assessments are designed to support learning and identify areas for improvement.
- **Summative Assessments:** Summative assessments, including final exams, projects, and presentations, evaluate students' overall performance and mastery of course content.

At SRU, our diverse delivery methods ensure that students receive a well-rounded and flexible education that caters to their individual learning preferences. We are committed to continuously enhancing our delivery methods to provide the best possible learning experience for our students.

# **COURSE STRUCTURE**

Code	Course	Lectures	Practicals	Credits
QSE100	Economics	120	0	12
QSE101	Design-Thinking for the Built Environment	120	0	12
QSE102	Residential Construction	100	20	12
QSE103	Introduction to Modern Construction Business	120	0	12
QSE104	Computing for Engineers	100	20	12
TOTAL				60

# YEAR 1: SEMESTER 1

#### YEAR 1: SEMESTER 2

Code	Course	Lectures	Practicals	Credits
QSE105	Measurement for Construction	100	20	12
QSE106	Integrated Construction	100	20	12
QSE107	Sector Technology	100	20	12
QSE108	Imagine Quantity Surveying and Cost	100	20	12
	Engineering			
QSE109	Communication for Academic Purposes	120	0	12

TOTAL 60			
	TOTAL		60

# YEAR 2: SEMESTER 3

Code	Course	Lectures	Practicals	Credits
QSE210	Commercial Construction	100	20	12
QSE211	Building Services	100	20	12
QSE212	Advanced Measurement for Construction	100	20	12
QSE213	Planning and Design Practice	100	20	12
QSE214	Communication for Professional Purposes	120	0	12
TOTAL				60
YEAR 2: SEMESTER 4				

Code	Course	Lectures	Practicals	Credits
QSE215	Urban Development Law	120	0	12
QSE216	Services & Heavy Engineering Measurement	100	20	12
QSE217	Construction Estimating	100	20	12
QSE218	Negotiation and Conflict Resolution	120	0	12
QSE219	Property Development	120	0	12
TOTAL				60

# YEAR 3: SEMESTER 5

Code	Course	Lectures	Practicals	Credits
QSE320	High-rise Construction	100	20	12
QSE321	Contract Administration	100	20	12
QSE322	Urban Studies	100	20	12
QSE323	Professional Practice I	0	120	12
QSE324	Research Methods for the Future Built	120	0	12
	Environment			
TOTAL				60

# YEAR 3: SEMESTER 6

Code	Course	Lectures	Practicals	Credits
QSE325	Cost Planning and Controls	100	20	12
QSE326	Land Use Planning	100	20	12
QSE327	Risk Management in the Energy and	100	20	12
	Resources Sectors			
QSE328	Stakeholder Engagement	120	0	12
QSE329	Professional Practice II	0	120	12
TOTAL				60

# YEAR 4: SEMESTER 7

Code	Course	Lectures	Practicals	Credits
QSE430	Project – Part A	20	100	12
QSE431	Transport Planning	100	20	12
QSE432	Construction Legislation	100	20	12
QSE433	Urban Design	100	20	12
QSE434	Professional Practice III	0	120	12
TOTAL				60

# YEAR 4: SEMESTER 8

Code	Course	Lectures	Practicals	Credits
QSE435	Project – Part B	20	100	12

QSE436	Environmental Planning	100	20	12
QSE437	Construction Project Management	100	20	12
QSE438	Professional Practice and Ethics	120	0	12
QSE439	Project Risk Management	120	0	12
TOTAL				60

# **COURSE DESCRIPTIONS**

# **ECONOMICS – 12 CREDITS**

Economics studies the efficient use and distribution of scarce resources. It is concerned with how people make decisions and interacts in markets. Economics examines the role of government in either obstructing or improving market outcomes and the effect of those decisions on the well being of society. Economics also studies the economy as a whole and key issues explored in this course include economic growth, inflation, unemployment and international trade. In studying these issues economists can understand how to manage the economy for the good of its citizens. In this course, students develop an understanding of the key principles and tools that economists use to interpret and critically analyze economic policies that impact on Africa and global economy.

# DESIGN THINKING FOR THE BUILT ENVIRONMENT – 12 CREDITS

In this introductory course, you will gain a big picture view of the strategies and interactions that influence the sustainable development of the built environment. Using design-thinking, you will consider the end user of built spaces and the social and cultural impacts of decisions at every stage process. You will analyze problems and consider various innovative solutions. you will learn appropriate terminology and communication strategies to communicate and negotiate with diverse stakeholders including clients, design managers, architects, project managers, urban planners, construction managers and quantity surveyors and cost engineers. You will also learn how and when these roles intersect and how you can have a strategic impact on the project development and planning process.

# **RESIDENTIAL CONSTRUCTION – 12 CREDITS**

This course develops your knowledge, skills and application for residential construction management. The course introduces current domestic construction techniques and materials that are the core of any construction process. You are taught to read plans and build a house by studying construction theory and legislation, visiting building sites, sketching construction details and drawing simple plans.

# INTRODUCTION TO MODERN CONSTRUCTION BUSINESS – 12 CREDITS

This course explores the role of construction firms as business entities in the construction industry. It introduces the business social and economic environments in which construction

firms operate, and the industry-specific challenges of growing and managing a socially responsible, forward thinking and profitable construction business. The ability to develop a business plan to competently guide business direction and growth is a core skill needed to navigate the dynamic and competitive nature of construction business. Key elements of the business plan include a competent analysis of the market, identifying and engaging key stakeholder, mitigating business risks and opportunities, and build a caring and inclusive corporate culture. This is an introductory unit and the knowledge and skills developed are relevant to construction management and related majors.

# **MEASUREMENT FOR CONSTRUCTION - 12 CREDITS**

This course is predominantly concerned with the activities undertaken by construction cost management professionals in preparing Bills pf Quantities (BQs) for construction work of simple nature. It teaches you to how formally measure to BQ items for residential and small commercial building works in accordance with the Countries Standard Method of measurement in the context of the tendering/procurement process. The course also provides a basic appreciation of virtual building graphical models as they relate to integrated practice concepts used in industry, by way of graphical presentation and spatial relationships of digital building models, and an introduction to cost management/building area measurement. The unit is an integral part of the Quantity Surveying-Cost Engineering degree, in linking with foundation courses in construction technology and preparing you for further advanced modules in building and infrastructure measurement and construction estimating.

# **INTEGRATED CONSTRUCTION – 12 CREDITS**

This a foundation module- integrating residential/ small commercial construction processes in a collaborative digital environment by utilizing building information modelling and related technology. The ability to use buildings information modelling and related technology in construction process in a collaborative digital environment involving a project team from different disciplines is important to work in the industry.

# INTRODUCTION TO HEAVY ENGINEERING SECTOR TECHNOLOGY – 12 CREDITS

The modules introduces' resources sector technology associated with on and Off Shore Oil and Gas (LNG), open cut and underground mining and power generation and distribution infrastructure including processing plans/ plan design and infrastructure systems. Students will also develop introductory knowledge of safety and risk management within these sectors and develop an appreciation of mineral economics.

# IMAGINE QUANTITY SURVEYING AND COST ENGINEERS – 12 CREDITS

This module introduces the broad scope of contemporary quantity surveying activity and cost engineering. It focuses on three broad areas of professional quantity surveying and cost engineering and in doing so, considers the similarities and differences across Quantity Surveying and Cost Engineering. Firstly, what it means to be professional is considered including image and status, fees, codes of ethics, professional competence and continuous professional development. Secondly, ways in which professionals engage with a workplace including terms of appointment are explored. Finally, the work of quantity surveying and cost

engineering takes place within a social environmental context and the module will relate interactions between business and environmental interests including the natural environment, environment economics and ecologically sustainable development.

# **COMMERCIAL CONSTRUCTION – 12 CREDITS**

This is a fundamental course that provides you with extensive theoretical knowledge to understand concepts, principles and construction techniques and procedures to commercial construction. It critically evaluates projects in terms of procurement, planning, scheduling techniques and site organization. The ability to manage and supervise the construction process of a cross section construction types such as low-rise residential apartment buildings and commercial and industrial building is an essential requirement for construction management professionals. The knowledge and skills developed in this module are relevant o both construction management and quantity surveying and cost engineering and build upon earlier modules in residential and integrate construction, building services, preparing you for further advanced modules in design for structures and high-rise construction management.

# **BUILDING SERVICES – 12 CREDITS**

This foundation Construction Management Module focuses on fire, mechanical and electrical services in preparation for further advanced units in commercial and High-rise Construction and Services and Heavy Measurement, it introduces fire detection, suppression and control, building hydraulic services including water supply, hot and cold water reticulation, storm water, and sanitary waste disposal systems; types of ventilation ; air-conditioning systems and heating installation procedures, electrical transformers, mains, sub-mains, switchboards, protection devices, power and lighting systems, data , communication, and security systems; systems monitoring; and energy management and efficiency. You will learn how to interpret building services drawings, evaluate services systems, apply calculation methods to critically analyze building services elements and propose solutions to related problems

# ADVANCED MEASUREMENT FOR CONSTRUCTION – 12 CREDITS

Measurement is a core skill and attribute among building and infrastructure professionals, particularly important in relation to the production of descriptive and quantified documents within the design cost management process for the purposes of tendering, estimating, and construction cost management practices within the construction and infrastructure sectors. This module develops a deeper appreciation of the measurement of more complex work sections and trades and the development and application of suitable and accurate construction cost management documents in a concise and systematic manner. More advanced strategies will be explored with virtual building graphical model as they relate to integrated practice concepts used in industry. This module builds on the measurement attributes developed in the first year studies and prepares you for further advanced modules in Services and Heavy Engineering Measurement Construction Estimating and other cost management areas.

# **PLANNING AND DESIGN PRACTICE – 12 CREDITS**

This course will provide you with an understanding of how the environment informs the decision and activities of built environment professionals. You will be introduced to principles, tools, and approaches for the identification, assessment and management of environmental impacts and environmental risk. Through integration with practitioners, you will learn about theories for environmental decision making and gain knowledge about the application of theories for environmental planning and management in practice. Lectures present environmental planning issues, policies, and methods. You will engage in dialogues on contemporary environmental dilemmas, exploring ethical and practical aspects that underpin conflict in environmental policy-making processes. Computer labs will refine the skills you acquired in site analysis modules, providing you with tools to facilitate collaborate problem solving with spatial models. This module will aid your preparation for professional practice.

# URBAN DEVELOPMENT LAW – 12 CREDITS

This module provides to students an introduction to the Country Legal Environment in which context they will be working. It addresses specific legal issues that impact on urban development and its intended to inform decisions that will need to be made while working in this area. An essential to professionals practicing in all areas of the built environment. The foundation skills and knowledge acquired in this module will underpin future learning.

# SERVICES AND HEAVY ENGINEERING MEASUREMENT - 12 CREDITS

This module develops deeper knowledge, skills and application of the measurement of more complex areas of services and heavy engineering including building services (hydraulics, drainage, mechanical and electrical) and heavy engineering works within the resources and infrastructure sectors. It builds on modules previously undertaken in the earlier years of this course such as Measurement of Construction, Heavy Engineering Sector Technology and Building services.

# **CONSTRUCTION ESTIMATING – 12 CREDITS**

An advanced construction management module focusing on construction cost quantification techniques linking to previous years basic work and understanding. It includes an introduction to the interrelationship between professions in estimating and the techniques available to quantify cost, definition of the fundamental elements of cost and methods of evaluating labor, materials and implication for the tendering process, first principles estimating, review of an estimate, subsequent negotiation and applications of estimating to variations and profit monitoring; outcome performance indicators, and introduction to current industry practice, tools and technology.

# **NEGOTIATION AND CONFLICT RESOLUTION – 12 CREDITS**

The development of Conflict Management and negotiation skills is essential for those tasked with shaping the built environment. In this course, you will acquire skills in effective communication, analysis of disputes and creative problem-solving through active participation in role-playing and reflective activities and intense investigation of real-world conflicts that arise through the development of land. Learning to thing about and respond to Conflict in a group work within your studies and into professional practice.

# **PROPERTY DEVELOPMENT – 12 CREDITS**

Property Development provides understanding of property development which is fundamental to the practice of property professionals. This module brings together concepts gained on strategic evaluation, risk, organizational structure, planning, construction and development feasibility analysis. This course provides an in depth look at multi-disciplined, multi-faceted process involved in property development from site selection through to disposal of complete projects.

# HIGH-RISE CONSTRUCTION – 12 CREDITS

The course covers the construction of high-rise building- generally buildings above 12 storeys high. The major differences from other building lie in the impact of increased height on design and Construction processes, with structural systems, services and safety being the most significant. The topics covered include: demolition, temporary services, deep excavations and foundations, retention and shoring systems, general engineering of structural components, multi-level form work systems, selection of construction methods and equipment, interaction of building components, systems and services, common building faults, failures and rectification, external cladding systems, general cost planning relevant for high-rise construction.

# **CONTRACT ADMINISTRATION – 12 CREDITS**

This course develops knowledge, skills and application in the administration of contraction type contracts which represent one of the core applications for construction managers, quantity surveyors and cost engineers. To gain an appreciation of commercial implications of contract administration you will study administrative implications for both parties to the contract.

# **URBAN STUDIES - 12 CREDITS**

This course introduces you to various demographic, economic, social and physical aspects of our cities to help understand the nature of the cities we live in. you will be exposed to various theoretical prospectives focusing on the growth and development of cities and their regions, with an emphasis on their spatial structure and the spatial distribution of population land uses and economic activities within them. You will develop your knowledge and skills in understanding the growth and development of cities, using real world examples.

# **PROFESSIONAL PRACTICE – 12 CREDITS**

Professionals need technical and generic skills, as well as real world knowledge, to thrive in contemporary professional work places. Much of your course focuses on the development of your technical skills and understanding of your field. This course, generally undertaken in the penultimate or final year of your course, requires you to undertake a self-sourced work placement or engage on ongoing professional work experience to consolidate your course-based learning. In tandem with or following such experience, students enroll in this course to

refine their reflective and communicative skills, formulating effective statements of their experience suitable for inclusion in job applications. assessments in this require you to critically analyze, report and reflect upon your professional practice experience, considering issues and governance in your chosen field and determining a professional development plan to help guide your career.

# **RESEARCH METHODS FOR THE FUTURE BUILT ENVIRONMENT – 12 CREDITS**

According to industry standards, built environment professionals must be able to identify and critically evaluate a broad range of sources of complex information, to inform proposed courses of action and "challenge established positions using evidence and reasoning." The course emphasis critical thinking and problem-solving skills and introduces a range of methods used in research.

# **COST PLANNING AND CONTROLS – 12 CREDITS**

The course applies the fundamental principles of cost management including design and construction cost planning (pre-construction) and project controls (during construction), including important techniques in managing project cost in the context of working closely in multidisciplinary teams. It covers cost management in both building and non-building sectors (for example, civil engineering and resource sectors).

# LAND USE PLANNING – 12 CREDITS

This is a foundation unit that provides opportunities for acquiring, refining and applying knowledge of and skills in land use planning and geographic information system in an integrated way. The module introduces spatial analysis techniques required to undertake contemporary real-world urban analysis required for land use planning. Gaining skills to confidently apply spatial analysis techniques in land use planning is critical for an urban planning practitioner whether working in public or private sector. The course also helps gaining knowledge and skills in analyzing substantive theoretical and practical concepts involved in land use planning, evaluating data and applying regulatory frameworks to inform land use decision-making, communicating land use planning concepts both visually and in writing, and proposing solutions to complex land use problems.

# PROJECT – PART A – 12 CREDITS

QSE124 Project – Part A and QSE129 Project – Part B are a 24 Credit point Capstone Sequence for the honors degree. These modules draw together knowledge that you have accumulated in the previous six semesters of the course and prepare you for your transition from university to the Professional World or into a postgraduate research study. In this unit (Part A), you will identify a problem or issue of relevance to your field and prepare a project proposal. In Part B you will complete your proposed project.

# **RISK MANAGEMENT IN THE ENERGY AND RESOURCES SECTORS – 12 CREDITS**

This fourth-year course in the Quantity Surveying and Cost Engineering builds on the basic knowledge, skills and understanding already gained in the previous courses. The module is set within the real-world scenario of the Heavy Engineering/Capital Intensive/Resource Sectors and relates to facilities management and procurement within the Engineering and Construction Management Cost Controls (capital expenditure/project controls) and procurement areas. It links to work previously undertaken in introduction Heavy Engineering Sector Technology, Cost Planning and Controls and Contract Administration and provides opportunities to undertake further research within the final year Capstone projects. The learning in this unit is provided by study and practice using real-world case studies and tools and techniques, some within a computer-based setting, that simulate the challenges, problems, issues and solutions that students will face in the QS and CE practice in the workplace.

# **STAKEHOLDER ENGAGEMENT – 12 CREDITS**

This is a core planning module that will address the theory, principles and methods for effective stakeholder engagement in planning processes. It introduces when and how to use different engagement methods to address planning Conflicts and gain important practical experience in Stakeholder engagement.

# TRANSPORT PLANNING – 12 CREDITS

This module introduces you to transport systems in selected cities around the world, facilities investigation into schemes and policies for promoting sustainable transport. The unit also assists you to integrate transport modeling theory with a set of analytical approaches which are frequently used in transport planning practice, including revealed and stated preference approaches. You will learn to design data collection instruments, analyze transport-related data, and communicate results effectively.

# **CONSTRUCTION LEGISLATION – 12 CREDITS**

This module introduces building laws and legal frameworks that regulate building works and construction activities to provide a broad understanding of how the mandatory technical requirements dictate the selection of the materials, construction elements, facilities, and services in buildings. It articulates the potential risks and issues associated with non-conformance and non-compliance and their impact on project cost, time, and quality. The ability to identify, assess and resolve issues of non-compliance in relation to the application of National Construction Code (NCC), relevant building act and associated legislative frameworks is critically important to achieve the minimum necessary performance requirements of buildings in relation to health, safety, amenity and sustainability. The knowledge and skills developed in this module are relevant to building professional practice in all areas of the built environments.

# **PROJECT – PART B – 12 CREDITS**

Project 1 – Part A and Project 1 Part B are the capstone research module for Honors degree that draw together the theory, practice and the urban development fundamental discipline knowledge that have been covered in the coursework studied in the previous six semesters of the program. Students are required to identify a research-related project or study which is designed to extend and broaden their understanding of the chosen issue. The purpose of these units is to prepare students for their transition to the professional world. You will be expected to demonstrate leadership/initiative, ethical and professional behavior in this course.

# **URBAN DESIGN – 12 CREDITS**

In this module you will study the dimension of urban design and learn techniques in urban design and public space analysis to produce informed urban design strategies that respond to the social, economic, environmental and political context of contemporary cities. Urban designers work with a variety of public and private stakeholders and confront a range of issues that impact urban development outcomes. An understanding of the influences on urban design decisions is necessary to prepare you to work in this context.

# **ENVIRONMENTAL PLANNING – 12 CREDITS**

This module increases your understanding of environmental analysis and planning issues, policies, and methods, aiming to prepare you for incorporation of environmental objectives and constraints in professional practice. In this course you will engage in dialogues on contemporary environmental dilemmas, exploring ethical and practical aspects which underpin conflict. You will further refine skills acquired in site analysis modules by learning to create and modify spatial modules to facilitate collaborative problem solving. These skills will aid in preparations for final year planning studio and professional practice.

# CONSTRUCTION PROJECT MANAGEMENT

This course provides an in-depth understanding of the principles and practices essential for effective management of construction projects. Students will explore project planning, scheduling, resource allocation, and risk management, with a focus on optimizing project performance and ensuring quality control. Emphasis is placed on the application of modern project management tools and techniques, including Building Information Modeling (BIM) and sustainable construction practices. Through case studies and practical exercises, students will develop the skills necessary to lead and manage construction projects from inception to completion, ensuring they are delivered on time, within budget, and to the required standards.

# **PROFESSIONAL PRACTICE AND ETHICS**

This course provides a comprehensive understanding of the ethical principles and professional standards essential for quantity surveyors and cost engineers. Students will explore topics such as professional conduct, client relationships, and the legal responsibilities of practitioners. Emphasis is placed on ethical decision-making, integrity, and the role of professional bodies in maintaining standards. Through case studies and practical scenarios, students will develop the skills to navigate complex ethical dilemmas and uphold the highest standards of professionalism in their practice.

# PROJECT RISK MANAGEMENT

This course equips students with the knowledge and skills to identify, assess, and manage risks in construction projects. Emphasizing both theoretical and practical aspects, the course covers risk identification, quantification, mitigation strategies, and the impact of risk on project costs and schedules. Students will learn to develop comprehensive risk management plans and apply industry-standard tools and techniques to ensure project success. Through case studies and real-world scenarios, students will gain the ability to navigate and mitigate risks effectively, ensuring projects are delivered on time, within budget, and to the required quality standards.

# **COURSE OUTLINES**

# **Course Title: Economics**

#### **Course Description:**

The Economics course for Quantity Surveying and Cost Engineering provides students with essential knowledge and skills related to economic principles, cost analysis, and financial management within the construction industry. Students learn how to apply economic concepts to project evaluation, budgeting, and decision-making.

# Learning Objectives:

By the end of this course, students should be able to:

- 1. Understand Economic Concepts:
  - Explore fundamental economic theories (e.g., supply and demand, utility, cost).
  - Apply economic reasoning to construction-related scenarios.

# 2. Cost Estimation and Analysis:

- Learn methods for estimating project costs.
- Analyze cost structures and factors affecting project budgets.

# 3. Financial Decision-Making:

- Evaluate investment decisions using financial metrics (e.g., NPV, IRR).
- Understand the time value of money.

# 4. **Project Evaluation and Feasibility:**

- Assess project viability based on economic criteria.
- Consider risk and uncertainty in economic evaluations.

#### **Topics Covered:**

# 1. Introduction to Construction Economics:

- Overview of the construction industry.
- Role of economics in project management.

# 2. Cost Estimation Techniques:

- Quantity surveying principles.
- Earthworks, concrete works, and finishing works estimation.

# 3. Financial Metrics and Investment Analysis:

- Net present value (NPV) and internal rate of return (IRR).
- Sensitivity analysis and decision trees.
- 4. Life Cycle Costing:
  - Evaluating costs over the entire project life cycle.
  - Incorporating maintenance, operation, and disposal costs.

# Assessment:

- Written exams
- Cost estimation projects
- Case studies and economic evaluations

#### **Recommended Reading:**

- 1. Peurifoy, R. L., & Oberlender, G. D. (2001). *Estimating Construction Costs* (5th edition). NY: McGraw-Hill Higher Education.
- 2. Kirk, S. J., & Dell'isola, A. J. (1995). *Life Cycle Costing for Design Professionals* (2nd edition). NY: McGraw-Hill, Inc.

#### **Course Title: Design Thinking for the Built Environment**

#### **Course Description:**

The "Design Thinking for the Built Environment" course introduces students to design thinking methodologies and their application within the context of architecture, construction, and urban planning. Students learn creative problem-solving techniques, empathy-driven approaches, and interdisciplinary collaboration to address complex challenges in the built environment.

#### Learning Objectives:

By the end of this course, students should be able to:

#### 1. Understand Design Thinking:

- Explore the principles and mindset of design thinking.
- Apply empathic understanding and user-centered approaches.

#### 2. Problem Reframing and Ideation:

- Learn techniques for problem definition and reframing.
- Generate innovative ideas through brainstorming and ideation.

# 3. **Prototyping and Testing:**

- Create low-fidelity prototypes to visualize concepts.
- Conduct iterative testing and refinement.

# 4. Interdisciplinary Collaboration:

- Collaborate with professionals from various disciplines (e.g., architects, engineers, urban designers).
- Integrate diverse perspectives into design solutions.

# 1. Introduction to Design Thinking:

- Overview of design thinking principles.
- Historical context and influential thinkers.
- 2. Empathic Understanding and User Research:
  - Conduct user interviews and observations.
  - Define user needs and pain points.
- 3. Problem Reframing and Ideation Techniques:
  - SCAMPER method (Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, Reverse).
  - Mind mapping and concept development.
- 4. Prototyping and Testing:
  - Rapid prototyping using physical and digital tools.
  - User testing and feedback loops.

# 5. Interdisciplinary Collaboration in Design Projects:

- Case studies of successful interdisciplinary projects.
- Effective communication and teamwork.

#### Assessment:

- Design thinking exercises and workshops.
- Group projects with real-world scenarios.
- Reflective essays on the design process.

# **Recommended Reading:**

- 1. Brown, T. (2009). Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation. HarperBusiness.
- 2. Liedtka, J., King, A., & Bennett, K. (2013). Solving Problems with Design Thinking: Ten Stories of What Works. Columbia University Press.

# **Course Title: Residential Construction**

# **Course Description:**

The Residential Construction course provides students with a comprehensive understanding of the principles, techniques, and processes involved in residential building projects. Students will learn about construction materials, methods, cost estimation, and project management specific to residential structures.

# Learning Objectives:

By the end of this course, students should be able to:

- 1. Understand Residential Construction Basics:
  - Explore the fundamentals of residential building design and construction.
  - Identify different types of residential structures (single-family homes, townhouses, apartments).
- 2. Construction Materials and Techniques:
  - Study common building materials (wood, concrete, steel).
  - Learn about framing, foundations, roofing, and finishes.
- 3. Cost Estimation and Budgeting:

- Develop skills in estimating construction costs for residential projects.
- Understand the impact of material choices and design decisions on project budgets.

# 4. Project Management for Residential Builds:

- Explore project scheduling, procurement, and risk management.
- Understand the roles of various professionals (architects, engineers, contractors) in residential construction.

# **Topics Covered:**

- 1. Introduction to Residential Construction:
  - Overview of the residential construction industry.
  - Legal and regulatory considerations.

# 2. Building Systems and Components:

- Structural systems (framing, load-bearing walls).
- Mechanical, electrical, and plumbing (MEP) systems.
- 3. Construction Materials and Methods:
  - Foundations (slabs, crawl spaces, basements).
  - Wall systems (wood framing, masonry).
  - Roofing and insulation.
- 4. Cost Estimation and Budget Control:
  - Quantity take-offs and pricing.
  - Budget development and tracking.
- 5. **Project Documentation and Quality Assurance:** 
  - Construction drawings and specifications.
  - Quality control during construction.

#### Assessment:

- Written exams
- Residential construction project case studies
- Cost estimation exercises

# **Recommended Reading:**

- 1. Ching, F. D. K., & Adams, C. (2014). Building Construction Illustrated. Wiley.
- 2. Peurifoy, R. L., & Oberlender, G. D. (2001). *Estimating Construction Costs* (5th edition). McGraw-Hill Higher Education.

#### **Course Title: Introduction to Modern Construction Business**

#### **Course Description:**

The "Introduction to Modern Construction Business" course provides students with foundational knowledge of the business aspects within the construction industry. Students will explore the economic, social, and technological factors that shape modern construction enterprises. The course emphasizes sustainable practices, innovation, and effective management strategies.

#### Learning Objectives:

By the end of this course, students should be able to:

# 1. Understand the Construction Industry Landscape:

- Explore the role of construction firms as business entities.
- Analyze the economic and social environments in which construction firms operate.

# 2. Challenges and Opportunities in Construction Business:

- Identify industry-specific challenges (e.g., labor shortages, regulatory compliance).
- Recognize opportunities for growth and innovation.

# 3. Business Management Principles:

- Study financial management, risk assessment, and strategic planning.
- Understand the impact of business decisions on project outcomes.

# 4. Sustainable and Ethical Business Practices:

- Explore socially responsible practices in construction.
- Consider environmental impact and community engagement.

# **Topics Covered:**

- 1. Introduction to Construction Business:
  - Overview of the construction industry's role in society.
  - Business models and organizational structures.

# 2. Economic and Social Context:

- Economic cycles and market trends.
- Social responsibility and ethical considerations.
- 3. Financial Management in Construction:
  - Budgeting, cost control, and financial reporting.
  - Project financing and investment decisions.

# 4. Innovation and Technology Adoption:

- Embracing digital tools and construction technology.
- Case studies of successful business transformations.

# Assessment:

- Written exams
- Business case studies
- Group discussions on industry challenges

#### **Recommended Reading:**

- 1. Smith, N. J., & Merna, T. (2018). *Managing the Professional Practice in the Built Environment*. Routledge.
- 2. Ofori, G. (2016). Construction Innovation and Process Improvement. Routledge.

# **Course Title: Measurement for Construction**

#### **Course Description:**

This course focuses on the principles and techniques of measurement and quantification in the context of construction projects. Students will learn how to accurately assess and quantify various aspects of building works, including materials, labor, and equipment. The course

emphasizes industry standards and guidelines for measurement, as well as the use of technology in quantity surveying practice.

# Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the role of the contemporary quantity surveyor in construction projects.
- 2. Apply industry measurement guidelines and principles to quantify basic domestic building construction work.
- 3. Estimate and prepare bills of quantities for domestic building construction.
- 4. Analyze tendering processes and understand their impact on project costs.
- 5. Utilize information and communication technology (ICT) effectively in quantity surveying practice.

#### **Topics Covered:**

- 1. Introduction to quantity surveying and cost engineering
- 2. Measurement techniques and standards
- 3. Bills of quantities preparation
- 4. Tendering and procurement processes
- 5. ICT tools for quantity surveying
- 6. Case studies and real-world examples

#### Assessment:

Assessment methods may include:

- Written assignments
- Practical measurement exercises
- Group projects
- End-of-semester examinations

#### **Recommended Reading:**

- 1. "Quantity Surveyor's Pocket Book" by Duncan Cartlidge
- 2. "Building Measurement: New Rules of Measurement" by RICS
- 3. Relevant industry standards and guidelines

#### Course Title: Integrated Construction

#### **Course Description:**

The "Integrated Construction" course delves into the intricacies of construction processes, emphasizing the integration of various aspects within the built environment. Students will gain practical skills related to project management, sustainable infrastructure, and cost insights. The course covers both technical and commercial aspects, preparing students for a successful career in quantity surveying.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand complex construction techniques and methodologies.
- 2. Manage construction procurement processes effectively.
- 3. Analyze commercial and financial matters related to construction projects.
- 4. Apply measurement and estimating techniques.
- 5. Gain insights into services and heavy engineering within the construction industry.

#### **Topics Covered:**

- 1. Construction technology and systems
- 2. Sustainable construction practices
- 3. Integrated project management
- 4. Measurement and estimating
- 5. Contract administration and law
- 6. Commercial management

#### Assessment:

Assessment methods may include:

- Written assignments
- Practical exercises related to measurement and estimating
- Case studies
- End-of-semester examinations

# **Recommended Reading:**

- 1. <u>"Building Economics, Quantity Surveying, and Cost Estimation"</u> (Course Outline from An-Najah National University)
- 2. Relevant industry standards and guidelines

# Course Title: Sector Technology

#### **Course Description:**

The "Sector Technology" course explores advanced topics related to technology within the construction industry. Students will delve into cutting-edge tools, techniques, and methodologies that impact quantity surveying and cost engineering. The course emphasizes the integration of technology, sustainability, and project management.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Analyze emerging technologies relevant to quantity surveying.
- 2. Apply digital tools for measurement, estimating, and project control.
- 3. Understand the impact of technology on construction processes.
- 4. Evaluate the economic and environmental implications of sector-specific technologies.

- 1. Building Information Modeling (BIM) and its applications
- 2. Digital measurement tools and software
- 3. Automation in quantity takeoff and cost estimation
- 4. Sustainable technology solutions
- 5. Case studies on successful technology implementation

#### Assessment:

Assessment methods may include:

- Research papers on technology trends
- Practical exercises using BIM software
- Group projects related to sector-specific technology

#### **Recommended Reading:**

- 1. BIM Handbook: A Guide to Building Information Modeling" by Chuck Eastman, Paul Teicholz, Rafael Sacks, and Kathleen Liston
- 2. Relevant industry reports and whitepapers

# Course Title: Imagine Quantity Surveying and Cost Engineering

#### **Course Description:**

The "Imagine Quantity Surveying and Cost Engineering" course explores innovative and forward-thinking approaches within the field of quantity surveying. Students will delve into cutting-edge practices, emphasizing creativity, sustainability, and value optimization. The course goes beyond traditional methods, preparing graduates for dynamic roles in the built environment.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. **Imagine**: Cultivate a visionary mindset, envisioning novel solutions for cost management and project delivery.
- 2. **Integrate**: Explore interdisciplinary collaboration, integrating technology, design, and construction principles.
- 3. **Innovate**: Develop creative strategies for cost estimation, risk assessment, and value engineering.
- 4. **Inspire**: Influence industry practices by embracing sustainability, ethical considerations, and social impact.

- 1. Imagining the Future: Trends in quantity surveying and emerging technologies
- 2. Integrated Approaches: BIM, collaborative workflows, and interdisciplinary teamwork
- 3. Innovative Cost Management: Beyond traditional measurement techniques
- 4. Inspiring Sustainability: Green construction, life cycle analysis, and circular economy
- 5. Industry Case Studies: Real-world examples of imaginative cost engineering

# Assessment:

Assessment methods may include:

- Visionary Proposals: Creative project ideas
- Collaborative Challenges: Team-based assignments
- Innovation Showcases: Presentations on sustainable practices

#### **Recommended Reading:**

- 1. "Futures Thinking for Construction" by Angela Lee and Keith Hampson
- 2. Relevant industry reports and thought leadership articles

#### **Course Title: Commercial Construction**

#### **Course Description:**

The "Commercial Construction" course provides an in-depth understanding of commercial building projects. Students will explore measurement, estimating, services, and heavy engineering within the context of commercial developments. The course emphasizes cost management, risk assessment, and legal considerations specific to commercial construction.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Quantify and assess costs related to commercial building projects.
- 2. Understand construction legislation and its impact on commercial developments.
- 3. Apply risk management techniques in the energy and resources sectors.
- 4. Evaluate whole-life cost solutions for commercial projects.

#### **Topics Covered:**

- 1. Commercial construction methods and technologies
- 2. Measurement and estimating for commercial buildings
- 3. Legal aspects: Contracts, regulations, and compliance
- 4. Risk assessment and mitigation strategies
- 5. Services and infrastructure in commercial developments

#### Assessment:

Assessment methods may include:

- Written assignments on cost estimation
- Case studies related to commercial projects
- Examinations on legal and risk management aspects

# **Recommended Reading:**

- 1. "Construction Law for Quantity Surveyors" by James D. O'Reilly
- 2. Relevant industry reports and guidelines

# **Course Title: Building Services**

#### **Course Description:**

The "Building Services" course focuses on the essential systems that make buildings functional, efficient, and comfortable. Students will explore the technical aspects of building services, including electrical, mechanical, plumbing, and HVAC (heating, ventilation, and air conditioning). The course emphasizes cost estimation, sustainability, and integration within construction projects.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the design and installation of building services.
- 2. Quantify costs related to electrical, plumbing, and HVAC systems.
- 3. Evaluate energy-efficient solutions for building services.
- 4. Apply measurement techniques specific to services installations.

#### **Topics Covered:**

- 1. Electrical systems: Lighting, power distribution, and safety
- 2. Plumbing and drainage systems
- 3. HVAC systems: Heating, cooling, and ventilation
- 4. Sustainability considerations in building services
- 5. Integration with overall project cost management

#### Assessment:

Assessment methods may include:

- Practical exercises related to services measurement
- Case studies on building services installations
- Written assignments on sustainable practices

#### **Recommended Reading:**

- 1. "Building Services Engineering" by David V. Chadderton
- 2. Relevant industry standards and guidelines

# **Course Title: Advanced Measurement for Construction**

# **Course Description:**

The "Advanced Measurement for Construction" course delves into specialized measurement techniques and quantification methods within the construction industry. Students will explore advanced principles, tools, and technologies used in cost estimation, procurement, and project management. The course emphasizes accuracy, efficiency, and industry relevance.

# Learning Objectives:

By the end of this course, students will be able to:

- 1. Apply industry measurement guidelines and principles to complex construction work.
- 2. Utilize relevant ICT tools for detailed estimating and cost management.
- 3. Understand valuation methods during various construction stages.
- 4. Analyze measurement challenges specific to large-scale projects.

#### **Topics Covered:**

- 1. Advanced Measurement Techniques: Beyond basic quantity takeoff
- 2. Estimating and Cost Management: Detailed analysis and optimization
- 3. Valuation Methods: Valuing work in progress and completed projects
- 4. Project-Specific Challenges: Tailoring measurement approaches

#### Assessment:

Assessment methods may include:

- Complex Measurement Exercises: Real-world scenarios
- Estimating Software Proficiency: Practical application
- Case Studies: Large-scale construction projects

#### **Recommended Reading:**

- 1. Measurement Using CESMM4: Civil Engineering Standard Method of Measurement by Martin Barnes
- 2. Relevant industry reports and guidelines

#### **Course Title: Planning and Design Practice**

#### **Course Description:**

The "Planning and Design Practice" course focuses on the collaborative aspects of construction projects. Students will explore the intersection of planning, design, and cost management. The course emphasizes effective communication, interdisciplinary teamwork, and practical application.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the planning and design phases in construction projects.
- 2. Collaborate with architects, engineers, and other professionals.
- 3. Apply cost considerations during the design process.

4. Evaluate real-world case studies related to planning and design challenges.

# **Topics Covered:**

- 1. Project planning and feasibility studies
- 2. Architectural design principles
- 3. Cost implications of design decisions
- 4. Interdisciplinary coordination
- 5. Sustainability in planning and design

#### Assessment:

Assessment methods may include:

- Design exercises and presentations
- Case studies on successful project planning
- Group projects involving interdisciplinary teams

#### **Recommended Reading:**

- 1. "Construction Planning, Equipment, and Methods" by Robert L. Peurifoy and Clifford J. Schexnayder
- 2. Relevant industry reports and guidelines

#### Course Title: Urban Development Law

#### **Course Description:**

The "Urban Development Law" course explores legal aspects related to construction and development within urban environments. Students will gain insights into regulations, land use planning, and property rights. The course emphasizes the intersection of legal frameworks with quantity surveying and cost engineering practices.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand zoning laws, building codes, and environmental regulations.
- 2. Analyze legal implications for construction projects in urban areas.
- 3. Apply legal principles to cost estimation, contracts, and risk management.
- 4. Navigate property rights and land development processes.

#### **Topics Covered:**

- 1. Urban Planning and Regulations: Zoning, permits, and land use policies
- 2. Construction Contracts and Liabilities: Legal aspects of project agreements
- 3. Environmental Compliance: Sustainability and regulatory requirements
- 4. Case Studies: Real-world examples of legal challenges in urban development

Assessment methods may include:

- Legal research papers
- Contract analysis exercises
- Group discussions on case studies

#### **Recommended Reading:**

- 1. "Land Use Planning and Development Regulation Law" by Julian Conrad Juergensmeyer and Thomas E. Roberts
- 2. Relevant legal journals and industry reports

#### **Course Title: Services and Heavy Engineering Measurement**

#### Course Description:

The "Services and Heavy Engineering Measurement" course provides an in-depth understanding of specialized measurement techniques within the construction industry. Students will explore quantification methods related to building services (such as electrical, plumbing, and HVAC systems) and heavy engineering components (such as structural elements and infrastructure). The course emphasizes accurate measurement, cost estimation, and integration with project management.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Quantify building services components (e.g., electrical installations, plumbing networks, HVAC systems) using industry standards.
- 2. Measure heavy engineering elements (e.g., foundations, steel structures, concrete works) accurately.
- 3. Apply cost estimation techniques specific to services and heavy engineering.
- 4. Understand the impact of accurate measurement on project budgets and resource allocation.

# **Topics Covered:**

#### 1. Building Services Measurement:

- Electrical systems: Lighting, power distribution, safety installations
- Plumbing and drainage networks
- HVAC systems: Heating, cooling, ventilation
- 2. Heavy Engineering Measurement:
  - Foundations and substructures
  - Structural elements: Steel, concrete, masonry
  - o Infrastructure components: Roads, bridges, utilities
- 3. Integration with Project Management:
  - Cost planning and control
  - Quantity takeoff methodologies
  - Case studies on successful measurement practices

Assessment methods may include:

- Practical measurement exercises
- Cost estimation assignments
- Collaborative projects related to services and heavy engineering

#### **Recommended Reading:**

- 1. Measurement Using CESMM4: Civil Engineering Standard Method of Measurement" by Martin Barnes
- 2. Relevant industry reports and guidelines

# **Course Title: Construction Estimating**

#### **Course Description:**

The "Construction Estimating" course introduces students to various cost estimation techniques throughout different phases of a construction project. Students will learn how to estimate costs from the conceptual design stage to detailed design. The course also emphasizes the importance of cost control and monitoring project cash flow.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand different types of cost estimation methods.
- 2. Apply cost estimation techniques during project planning and design.
- 3. Monitor project cash flow and control costs effectively.

#### **Topics Covered:**

#### 1. Conceptual Cost Estimation:

- Preliminary estimates based on project scope and high-level design.
- Order of magnitude (ROM) estimates.

# 2. Detailed Cost Estimation:

- o Detailed takeoff and quantification of materials, labor, and equipment.
- Unit rates and pricing.
- 3. Cost Control and Monitoring:
  - Break-even analysis for construction tasks.
  - Cash flow management.
- 4. Case Studies and Practical Exercises:
  - Real-world examples of successful cost estimation practices.

Assessment methods may include:

- Cost estimation assignments.
- Case studies analyzing cost control strategies.
- Practical exercises related to project cash flow.

#### **Recommended Reading:**

- 1. Construction Cost Estimating" by **Coursera**.
- 2. Relevant industry reports and guidelines.

#### **Course Title: Negotiation and Conflict Resolution**

#### **Course Description:**

The "Negotiation and Conflict Resolution" course equips students with essential skills for managing disputes, resolving conflicts, and reaching mutually beneficial agreements within the construction industry. Students will learn effective negotiation techniques, conflict avoidance strategies, and legal considerations. The course emphasizes practical application and ethical decision-making.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the principles of negotiation and its role in dispute resolution.
- 2. Apply conflict resolution strategies specific to construction projects.
- 3. Analyze legal implications during negotiations.
- 4. Develop persuasive communication skills for successful outcomes.

# **Topics Covered:**

- 1. Introduction to Negotiation:
  - Types of negotiation (collaboration, compromise, problem-solving).
  - Negotiation styles and approaches.

# 2. Conflict Avoidance and Management:

- Identifying potential conflicts.
- Strategies for preventing disputes.
- 3. Legal Considerations:
  - Contractual obligations and dispute resolution clauses.
  - Mediation and arbitration.
- 4. Practical Exercises and Case Studies:
  - Simulated negotiations.
  - Real-world conflict scenarios.

#### Assessment:

Assessment methods may include:

- Role-playing negotiation scenarios.
- Written reflections on conflict resolution strategies.

• Legal case analyses related to construction disputes.

# **Recommended Reading:**

- 1. Getting to Yes: Negotiating Agreement Without Giving In by Roger Fisher, William Ury, and Bruce Patton.
- 2. Relevant industry reports and guidelines.

# **Course Title: Property Development**

# **Course Description:**

The "Property Development" course explores the intricacies of real estate development, emphasizing financial feasibility, risk assessment, and project management. Students will gain insights into the entire property development lifecycle, from site selection to project completion. The course integrates quantity surveying principles with property development practices.

# Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the fundamentals of property development, including market analysis and site evaluation.
- 2. Apply cost estimation techniques specific to property development projects.
- 3. Evaluate financial viability, considering construction costs, land acquisition, and revenue potential.
- 4. Collaborate with architects, planners, and other professionals in the property development process.

# **Topics Covered:**

- 1. Introduction to Property Development:
  - Market research and demand analysis.
  - $\circ$  Site selection criteria.
- 2. Cost Estimation for Property Development:
  - Quantification of construction costs.
  - Land valuation and acquisition expenses.
- 3. Financial Modeling and Risk Assessment:
  - Feasibility studies and cash flow projections.
  - Risk mitigation strategies.
- 4. Project Management in Property Development:
  - Design coordination, permitting, and construction oversight.
  - Stakeholder communication and teamwork.

# Assessment:

Assessment methods may include:

- Property development case studies.
- Financial modeling exercises.

• Collaborative project work.

# **Recommended Reading:**

- 1. Property Development" by Richard Reed and Sara Wilkinson.
- 2. Relevant industry reports and guidelines.

# Course Title: High-rise Construction

# **Course Description:**

The "High-rise Construction" course delves into the complexities of tall building projects. Students will explore the unique challenges associated with constructing skyscrapers, including cost estimation, risk management, and sustainability considerations. The course emphasizes practical skills relevant to quantity surveying in high-rise developments.

# Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the technical aspects of high-rise construction, including structural systems and materials.
- 2. Apply specialized measurement techniques for tall buildings.
- 3. Evaluate cost implications specific to high-rise projects.
- 4. Collaborate with architects, engineers, and contractors in the vertical construction industry.

# **Topics Covered:**

- 1. Structural Systems for High-rise Buildings:
  - Reinforced concrete, steel, and composite structures.
  - Wind and seismic considerations.
- 2. Measurement Techniques:
  - Quantification of materials, labor, and equipment.
  - Vertical takeoff methodologies.
- 3. Cost Estimation and Budgeting:
  - Detailed cost breakdowns for tall buildings.
  - Value engineering and cost optimization.
- 4. Sustainability in High-rise Construction:
  - Energy efficiency, green materials, and life cycle analysis.

# Assessment:

Assessment methods may include:

- High-rise project case studies.
- Cost estimation exercises specific to tall buildings.
- Collaborative assignments related to vertical construction.

# **Recommended Reading:**

- 1. "High-Rise Manual: Typology and Design, Construction, and Technology" by Johan Van Den Broek, Jaapjan Berg, and Piet M. Oskam.
- 2. Relevant industry reports and guidelines.

# Course Title: Contract Administration

#### **Course Description:**

The "Contract Administration" course focuses on the practical aspects of managing construction contracts. Students will learn about contract law, procurement processes, and effective administration techniques. The course emphasizes the role of quantity surveyors in ensuring contract compliance, risk mitigation, and successful project delivery.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the legal framework governing construction contracts.
- 2. Apply contract administration principles during project execution.
- 3. Evaluate variations, claims, and dispute resolution mechanisms.
- 4. Collaborate with project stakeholders to ensure contract compliance.

#### **Topics Covered:**

- 1. Contract Law and Basics:
  - Elements of a valid contract.
  - Types of construction contracts (e.g., lump sum, cost-plus, design-build).
- 2. Procurement and Tendering:
  - Bid evaluation and selection.
  - Contract award processes.
- 3. Contract Administration Techniques:
  - Change orders and variations.
  - Payment certification and progress monitoring.
  - Record keeping and documentation.
- 4. Risk Management and Dispute Resolution:
  - Identifying and mitigating contract risks.
  - Handling claims and disputes.
  - Mediation, arbitration, and litigation.

#### Assessment:

Assessment methods may include:

- Case studies on contract administration challenges.
- Role-playing exercises simulating contract negotiations.
- Written assignments analyzing real-world contract scenarios.

#### **Recommended Reading:**

- 1. "Construction Contract Administration" by Edward R. Fisk.
- 2. Relevant industry guidelines and standard forms of contract.

# **Course Title: Urban Studies**

#### **Course Description:**

The "Urban Studies" course explores the multifaceted aspects of urban environments, emphasizing planning, development, and sustainability. Students will gain insights into the social, economic, and environmental dynamics that shape cities. The course integrates quantity surveying principles with urban planning and design.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand urbanization trends, challenges, and opportunities.
- 2. Analyze the impact of infrastructure development on urban landscapes.
- 3. Apply cost estimation techniques specific to urban projects.
- 4. Collaborate with urban planners, architects, and policymakers.

#### **Topics Covered:**

- 1. Urbanization and Demographics:
  - Population growth, migration, and urban sprawl.
  - Social equity and inclusivity in cities.
- 2. Urban Infrastructure and Services:
  - Transportation networks, utilities, and public spaces.
  - Cost implications of urban development.
- 3. Sustainable Urban Design:
  - o Green building practices, energy efficiency, and waste management.
  - Case studies on successful urban projects.
- 4. Collaboration and Stakeholder Engagement:
  - Engaging with local communities and government agencies.
  - Balancing economic, social, and environmental priorities.

#### Assessment:

Assessment methods may include:

- Urban planning exercises.
- Cost estimation projects related to urban infrastructure.
- Group discussions on urban development challenges.

#### **Recommended Reading:**

- 1. "The Death and Life of Great American Cities" by Jane Jacobs.
- 2. Relevant industry reports and guidelines.

# **Course Title: Professional Practice**

# **Course Description:**

The "Professional Practice" course prepares students for the practical aspects of working as quantity surveyors and cost engineers. Students will learn about industry standards, ethical considerations, and effective communication within the built environment sector. The course emphasizes professional conduct, collaboration, and career readiness.

# Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the role and responsibilities of quantity surveyors and cost engineers.
- 2. Apply ethical principles in decision-making and client interactions.
- 3. Communicate effectively with project stakeholders, including architects, contractors, and clients.
- 4. Navigate industry regulations and professional codes of conduct.

# **Topics Covered:**

- 1. **Professional Ethics and Conduct**:
  - RICS Code of Conduct and ethical guidelines.
  - Conflict of interest and confidentiality.
- 2. Effective Communication Skills:
  - Written and verbal communication.
  - Negotiation and conflict resolution.

# 3. Industry Standards and Regulations:

- Compliance with relevant laws and regulations.
- Health and safety considerations.

# 4. Career Development and Networking:

- CV writing, job interviews, and networking opportunities.
- Continuing professional development (CPD).

# Assessment:

Assessment methods may include:

- Case studies on ethical dilemmas.
- Role-playing exercises simulating client interactions.
- Professional portfolio development.

# **Recommended Reading:**

- 1. RICS Rules of Conduct for Members" (Royal Institution of Chartered Surveyors).
- 2. Relevant industry reports and guidelines.

# **Course Title: Research Methods for the Future Built Environment**

# **Course Description:**

The "Research Methods for the Future Built Environment" course introduces students to essential research methodologies, tools, and techniques relevant to the construction industry. Students will learn how to conduct rigorous research, analyze data, and apply findings to real-

world scenarios. The course emphasizes evidence-based decision-making and critical thinking.

# Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the principles of research design and methodology.
- 2. Apply statistical analysis techniques to construction-related data.
- 3. Develop research proposals and execute research projects.
- 4. Evaluate the impact of research on the built environment.

#### **Topics Covered:**

- 1. Introduction to Research Methods:
  - Types of research (quantitative, qualitative, mixed methods).
  - Research ethics and data collection.
- 2. Statistical Analysis for Construction Research:
  - Descriptive statistics, inferential statistics, and hypothesis testing.
  - Regression analysis and correlation.
- 3. Research Proposal Development:
  - Problem formulation, literature review, and research questions.
  - Sampling techniques and data collection methods.

#### 4. Applied Research in the Built Environment:

- Case studies, fieldwork, and data interpretation.
- Communicating research findings effectively.

#### Assessment:

Assessment methods may include:

- Research proposal development.
- Data analysis exercises using statistical software.
- Research project presentations.

#### **Recommended Reading:**

- 1. "Research Methods for Engineers" by Cambridge University Press & Assessment.
- 2. Relevant industry reports and scholarly articles.

# **Course Title: Cost Planning and Controls**

#### **Course Description:**

The "Cost Planning and Controls" course provides students with essential knowledge and skills related to managing costs throughout construction projects. Students will learn about cost estimation, budgeting, monitoring, and effective control mechanisms. The course emphasizes practical application and industry relevance.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the principles of cost planning and budget development.
- 2. Apply techniques for accurate cost estimation during project planning.
- 3. Monitor project costs, track variances, and adjust budgets as needed.
- 4. Collaborate with project stakeholders to ensure effective cost controls.

#### **Topics Covered:**

- 1. Cost Estimation Techniques:
  - Quantity takeoff methods.
  - Unit rates and pricing.
  - Software tools for accurate estimates.
- 2. Budget Development and Allocation:
  - Creating project budgets.
  - Allocating costs to different project phases.
- 3. Cost Monitoring and Reporting:
  - Tracking actual costs against budgeted amounts.
  - Variance analysis and corrective actions.
- 4. Contractual Considerations:
  - Cost control clauses in contracts.
  - Change orders and their impact on costs.

#### Assessment:

Assessment methods may include:

- Cost estimation exercises.
- Case studies analyzing cost control strategies.
- Practical assignments related to project budgets.

#### **Recommended Reading:**

- 1. "Construction Cost Management: Learning from Case Studies" by Keith Potts.
- 2. Relevant industry reports and guidelines.

# **Course Title: Land Use Planning**

#### **Course Description:**

The "Land Use Planning" course explores the principles, practices, and regulations related to land development and urban growth. Students will gain insights into sustainable land use, zoning, and spatial planning. The course emphasizes collaboration with architects, urban designers, and policymakers to create functional and resilient built environments.

#### Learning Objectives:

By the end of this course, students will be able to:

1. Understand the role of land use planning in shaping cities and communities.

- 2. Analyze zoning regulations, land development codes, and environmental considerations.
- 3. Apply cost estimation techniques specific to land development projects.
- 4. Collaborate with professionals to create well-designed, efficient, and inclusive urban spaces.

#### **Topics Covered:**

- 1. Introduction to Land Use Planning:
  - Historical context and contemporary challenges.
  - Urbanization trends and population dynamics.
- 2. Zoning and Regulatory Frameworks:
  - Zoning codes, land use designations, and development permits.
  - Environmental impact assessments.
- 3. Spatial Planning and Infrastructure:
  - Site analysis, land suitability, and master planning.
  - Transportation networks, utilities, and public spaces.
- 4. Sustainable Land Use Practices:
  - o Green infrastructure, mixed-use developments, and brownfield redevelopment.
  - o Case studies on successful land use planning.

#### Assessment:

Assessment methods may include:

- Land use planning exercises (e.g., site analysis, zoning proposals).
- Research projects on urban growth and sustainability.
- Collaborative assignments with professionals from related fields.

#### **Recommended Reading:**

- 1. "Urban Land Use Planning" by Philip R. Berke and David R. Godschalk.
- 2. Relevant industry reports and guidelines.

#### Course Title: Project Part A

#### **Course Description:**

The "Project Part A" course provides students with foundational knowledge and practical skills related to construction projects. Students will learn about project management, cost estimation, and contract administration. The course emphasizes collaboration, problem-solving, and industry relevance.

# Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the project life cycle and phases.
- 2. Apply cost estimation techniques during project planning.
- 3. Analyze contract documents and administration procedures.
- 4. Collaborate with project stakeholders effectively.

# **Topics Covered:**

- 1. Introduction to Construction Projects:
  - Project initiation, planning, execution, and closure.
  - Roles and responsibilities of project team members.
- 2. Cost Estimation and Budgeting:
  - Quantity takeoff methods.
  - Unit rates, pricing, and budget development.
- 3. Contract Administration:
  - Contract types, terms, and obligations.
  - o Change orders, claims, and dispute resolution.
- 4. Collaboration and Communication:
  - Effective teamwork and stakeholder engagement.
  - Problem-solving in project scenarios.

# Assessment:

Assessment methods may include:

- Project planning exercises.
- Cost estimation assignments.
- Case studies on contract administration.

#### **Recommended Reading:**

- 1. "Construction Project Management" by Frederick Gould and Nancy Joyce
- 2. Relevant industry reports and guidelines.

# Course Title: Risk Management in the Energy and Resources Sectors

#### **Course Description:**

The "Risk Management in the Energy and Resources Sector" course equips students with essential knowledge and skills related to identifying, assessing, and mitigating risks in large-scale projects within the energy and resources industry. Students will learn about risk quantification, cost implications, and effective risk management strategies. The course emphasizes collaboration, critical thinking, and practical application.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the unique risks associated with energy and resources projects.
- 2. Quantify risk and its impact on project schedules, costs, and quality.
- 3. Apply risk management techniques specific to the sector.
- 4. Collaborate with project stakeholders to develop robust risk mitigation plans.

# **Topics Covered:**

# 1. Introduction to Risk Management:

• Risk identification and assessment methodologies.

- Risk registers and probability analysis.
- 2. Energy and Resources Industry Risks:
  - Environmental risks (e.g., pollution, habitat disruption).
  - Geotechnical risks (e.g., subsidence, landslides).
  - Supply chain risks (e.g., material shortages, logistics).

# 3. Cost Implications of Risk:

- Contingency planning and budget allocation.
- Risk-adjusted cost estimates.

# 4. Effective Risk Mitigation Strategies:

- Contractual risk allocation.
- Insurance and bonding.
- Scenario planning and sensitivity analysis.

#### Assessment:

Assessment methods may include:

- Case studies on risk management in energy and resources projects.
- Risk quantification exercises.
- Collaborative risk mitigation plans.

#### **Recommended Reading:**

- 1. "Risk Management in Energy and Resources Projects" by John Doe.
- 2. Relevant industry reports and guidelines.

# Course Title: Stakeholder Engagement

#### **Course Description:**

The "Stakeholder Engagement" course focuses on effective communication, collaboration, and relationship-building within construction projects. Students will learn how to engage with various stakeholders, including clients, contractors, local communities, and regulatory bodies. The course emphasizes ethical considerations, conflict resolution, and sustainable practices.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the importance of stakeholder engagement in project success.
- 2. Identify and analyze key stakeholders in construction projects.
- 3. Develop communication strategies to address diverse stakeholder needs.
- 4. Collaborate with project teams to create positive relationships and manage expectations.

- 1. Introduction to Stakeholder Theory:
  - Stakeholder identification and mapping.
  - Power-interest matrix.
- 2. Effective Communication Strategies:

- Tailoring messages to different stakeholder groups.
- Conflict resolution techniques.

# 3. Ethical Considerations and Social Responsibility:

- Balancing economic, environmental, and social interests.
- Community engagement and social impact assessment.

# 4. Sustainable Stakeholder Engagement:

- Sustainable development goals (SDGs).
- Case studies on successful stakeholder management.

# Assessment:

Assessment methods may include:

- Stakeholder analysis exercises.
- Role-playing scenarios for effective communication.
- Group projects addressing stakeholder engagement challenges.

#### **Recommended Reading:**

- 1. "Stakeholder Theory: Concepts and Strategies" by R. Edward Freeman.
- 2. Relevant industry reports and guidelines.

# **Course Title: Transport Planning**

#### **Course Description:**

The "Transport Planning" course provides students with essential knowledge and skills related to planning, designing, and managing transportation systems. Students will learn about urban mobility, traffic flow, sustainable transport options, and infrastructure development. The course emphasizes collaboration, cost considerations, and environmental impact.

# Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the principles of transportation planning and its impact on urban development.
- 2. Analyze traffic patterns, congestion, and mobility challenges.
- 3. Apply cost estimation techniques specific to transportation projects.
- 4. Collaborate with urban planners, engineers, and policymakers to create efficient and sustainable transport networks.

# **Topics Covered:**

- 1. Introduction to Transport Planning:
  - Role of transportation in urban areas.
  - Modes of transport (road, rail, public transit, cycling, walking).

# 2. Traffic Flow and Capacity Analysis:

- Traffic modeling and simulation.
- Intersection design and optimization.

# 3. Sustainable Transport Solutions:

- Public transit planning.
- Active transportation (cycling and walking).

- Electric and shared mobility options.
- 4. Infrastructure Development and Cost Estimation:
  - Roadway design, bridges, and tunnels.
  - Life cycle cost analysis.
  - Environmental considerations.

#### Assessment:

Assessment methods may include:

- Transport planning projects (e.g., designing a bus rapid transit system).
- Cost estimation exercises related to transportation infrastructure.
- Collaborative assignments addressing urban mobility challenges.

#### **Recommended Reading:**

- 1. "Transportation Engineering: An Introduction" by C. Jotin Khisty and B. Kent Lall.
- 2. Relevant industry reports and guidelines.

# Course Title: Project Part B

#### **Course Description:**

The "Project Part B" course builds upon foundational knowledge acquired in earlier stages of the program. Students will apply their skills to manage complex construction projects, focusing on cost estimation, contract administration, and risk management. The course emphasizes practical application, collaboration, and industry relevance.

#### Learning Objectives:

By the end of this course, students will be able to:

#### 1. Advanced Cost Estimation:

- Refine cost estimation techniques for large-scale projects.
- Consider risk factors and uncertainties.

#### 2. Contract Administration and Claims:

- o Analyze contract documents and administer contracts effectively.
- Address variations, claims, and disputes.

# 3. Project Risk Management:

- Identify, assess, and mitigate risks.
- Develop risk management plans.

# 4. Collaboration and Leadership:

- Work effectively with multidisciplinary teams.
- Lead project-related activities.

# **Topics Covered:**

# 1. Cost Estimation and Budget Control:

• Advanced measurement methods.

- Value engineering and cost optimization.
- 2. Contractual Considerations:
  - o Change orders, extensions of time, and payment certificates.
  - Legal aspects of contract administration.
- 3. Risk Identification and Mitigation:
  - Risk registers and risk assessment.
    - Contingency planning.
- 4. Project Leadership and Communication:
  - Effective project management.
  - Stakeholder engagement and reporting.

# Assessment:

Assessment methods may include:

- Real-world case studies.
- Project simulations.
- Collaborative assignments addressing project challenges.

# **Recommended Reading:**

1. Construction Project Management: Principles and Practice" by Chris March and Stephen Emmitt.

# **Course Title: Construction Legislation**

# **Course Description:**

The "Construction Legislation" course provides students with essential knowledge of legal frameworks and regulations relevant to the construction industry. Students will learn about contract law, health and safety regulations, environmental compliance, and dispute resolution mechanisms. The course emphasizes practical application, risk management, and ethical considerations.

# Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the legal principles governing construction contracts.
- 2. Apply contract administration procedures and manage legal risks.
- 3. Analyze health and safety regulations specific to construction sites.
- 4. Collaborate with project stakeholders to ensure compliance with legal requirements.

# **Topics Covered:**

- 1. Contract Law and Administration:
  - Types of construction contracts (e.g., lump sum, design-build).
  - Contractual obligations, variations, and claims.
- 2. Health and Safety Regulations:
  - Construction site safety practices.
  - Legal responsibilities of contractors and employers.

# 3. Environmental Compliance:

• Environmental impact assessments.

• Sustainable construction practices.

# 4. Dispute Resolution Mechanisms:

- Mediation, arbitration, and litigation.
- Handling contract disputes effectively.

# Assessment:

Assessment methods may include:

- Case studies on contract disputes and legal compliance.
- Written assignments analyzing health and safety regulations.
- Collaborative projects addressing legal challenges in construction.

# **Recommended Reading:**

1. "Construction Law for Quantity Surveyors" by James D. O'Reilly.

# **Course Title: Urban Design**

#### **Course Description:**

The "Urban Design" course explores the principles, practices, and theories related to shaping the built environment in urban areas. Students will learn about spatial planning, architectural aesthetics, and community engagement. The course emphasizes collaboration, sustainable design, and creating vibrant, functional urban spaces.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the role of urban design in creating livable cities.
- 2. Analyze urban form, public spaces, and streetscapes.
- 3. Apply design principles to enhance aesthetics and functionality.
- 4. Collaborate with architects, planners, and policymakers to create well-designed urban environments.

- 1. Introduction to Urban Design:
  - Historical context and contemporary challenges.
  - Urban morphology and typologies.
- 2. Spatial Planning and Placemaking:
  - Site analysis and context-sensitive design.
  - Public spaces, parks, and green infrastructure.
- 3. Sustainable Urban Design:

- Energy-efficient buildings and transportation.
- Mixed-use developments and walkability.

# 4. Community Engagement and Design Advocacy:

- Participatory design processes.
- Case studies on successful urban design projects.

# Assessment:

Assessment methods may include:

- Urban design projects (e.g., redesigning a public square).
- Design critiques and presentations.
- Collaborative assignments addressing urban design challenges.

#### **Recommended Reading:**

1. "The Death and Life of Great American Cities" by Jane Jacobs.

# **Course Title: Environmental Planning**

#### **Course Description:**

The "Environmental Planning" course explores the intersection of construction projects with environmental sustainability. Students will learn about regulations, impact assessments, and sustainable practices. The course emphasizes collaboration, cost considerations, and ethical environmental stewardship.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the environmental impact of construction activities.
- 2. Analyze regulations related to environmental protection.
- 3. Apply sustainable practices in construction planning and design.
- 4. Collaborate with environmental professionals to create eco-friendly projects.

- 1. Introduction to Environmental Planning:
  - Environmental laws and policies.
  - Environmental impact assessments.
- 2. Sustainable Construction Practices:
  - Green building materials and energy-efficient designs.
  - Waste reduction and recycling.
- 3. Cost Implications of Environmental Measures:

- Life cycle cost analysis.
- Budgeting for sustainable features.

# 4. Collaboration with Environmental Experts:

- $_{\odot}$   $\,$  Engaging with ecologists, landscape architects, and regulators.
- Case studies on successful environmentally conscious projects.

# Assessment:

Assessment methods may include:

- Environmental impact assessment exercises.
- Sustainable design projects.
- Collaborative assignments addressing environmental challenges in construction.

#### **Recommended Reading:**

1. "Sustainable Construction: Green Building Design and Delivery" by Charles J. Kibert.

# Professional Practice and Ethics

#### **Course Description:**

This course provides a comprehensive understanding of the ethical principles and professional standards essential for quantity surveyors and cost engineers. Students will explore topics such as professional conduct, client relationships, and the legal responsibilities of practitioners. Emphasis is placed on ethical decision-making, integrity, and the role of professional bodies in maintaining standards. Through case studies and practical scenarios, students will develop the skills to navigate complex ethical dilemmas and uphold the highest standards of professionalism in their practice.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand and apply ethical principles and professional standards in quantity surveying and cost engineering.
- 2. Analyze and resolve ethical dilemmas using appropriate frameworks and decisionmaking processes.
- 3. Demonstrate knowledge of the legal responsibilities and professional conduct expected of practitioners.
- 4. Develop effective client relationship management skills.
- 5. Recognize the role of professional bodies in maintaining and promoting ethical standards.

- 1. Introduction to Professional Ethics
  - Definition and importance of ethics in professional practice
  - Ethical theories and principles
- 2. Professional Conduct and Responsibilities
  - Codes of conduct and professional standards

- Legal responsibilities and liabilities
- 3. Ethical Decision-Making
  - Frameworks for ethical decision-making
  - Case studies and practical scenarios

# 4. Client Relationships and Management

- Building and maintaining client trust
- Managing conflicts of interest

# 5. Role of Professional Bodies

- Overview of professional bodies (e.g., RICS, CIOB)
- Role in promoting and enforcing ethical standards

# 6. Sustainability and Ethics

- Ethical considerations in sustainable construction
- Balancing economic, social, and environmental responsibilities

# Assessment:

- **Assignments**: Written assignments analyzing ethical case studies (30%)
- **Examinations**: Mid-term and final exams testing knowledge of ethical principles and professional standards (40%)
- **Presentations**: Group presentations on ethical dilemmas and proposed solutions (20%)
- Class Participation: Active participation in discussions and case study analyses (10%)

#### Recommended Reading:

- 1. "Professional Ethics in Construction and Surveying" by Greg Watts
- 2. "Ethics and the Built Environment" by Warwick Fox
- 3. "Construction Law and Management" by Keith Pickavance
- 4. "The RICS Code of Conduct" by the Royal Institution of Chartered Surveyors (RICS)
- 5. **"Professional Ethics for the Construction Industry"** by Rebecca Mirsky and John Schaufelberger

# Project Risk Management

# **Course Description:**

This course equips students with the knowledge and skills to identify, assess, and manage risks in construction projects. Emphasizing both theoretical and practical aspects, the course covers risk identification, quantification, mitigation strategies, and the impact of risk on project costs and schedules. Students will learn to develop comprehensive risk management plans and apply industry-standard tools and techniques to ensure project success. Through case studies and real-world scenarios, students will gain the ability to navigate and mitigate risks effectively, ensuring projects are delivered on time, within budget, and to the required quality standards.

# Learning Objectives:

By the end of this course, students will be able to:

1. Identify and assess various types of risks in construction projects.

- 2. Develop and implement effective risk management plans.
- 3. Apply industry-standard tools and techniques for risk quantification and mitigation.
- 4. Analyze the impact of risks on project costs and schedules.
- 5. Navigate and resolve real-world risk scenarios in construction projects.

# **Topics Covered:**

- 1. Introduction to Risk Management
  - Definition and importance of risk management
  - Types of risks in construction projects
- 2. Risk Identification and Assessment
  - Techniques for identifying risks
  - Qualitative and quantitative risk assessment methods

# 3. Risk Mitigation Strategies

- Developing risk response plans
- Risk avoidance, reduction, transfer, and acceptance

# 4. Risk Quantification

- Tools and techniques for quantifying risks
- Probability and impact analysis
- 5. Impact of Risks on Project Costs and Schedules
  - Analyzing cost and schedule risks
  - Contingency planning

# 6. Risk Management Tools and Techniques

- Industry-standard software and tools
- Case studies and practical applications

# 7. Developing Risk Management Plans

- Components of a comprehensive risk management plan
- o Implementation and monitoring
- 8. Case Studies and Real-World Scenarios
  - o Analysis of real-world construction projects
  - Lessons learned and best practices

# Assessment:

- Assignments: Written assignments analyzing risk management case studies (30%)
- **Examinations**: Mid-term and final exams testing knowledge of risk management principles and techniques (40%)
- **Projects**: Group projects developing and presenting risk management plans (20%)
- **Class Participation**: Active participation in discussions and case study analyses (10%)

# **Recommended Reading:**

- 1. "Project Risk Management: Processes, Techniques and Insights" by Chris Chapman and Stephen Ward
- 2. "Construction Risk Management Decision Making" by Alex C. Arthur
- 3. "Risk Management in Projects" by Martin Loosemore, John Raftery, Charles Reilly, and David Higgon
- 4. **"The Essentials of Risk Management"** by Michel Crouhy, Dan Galai, and Robert Mark
- 5. **"A Guide to the Project Management Body of Knowledge (PMBOK Guide)"** by Project Management Institute (PMI)

# **Construction Project Management**

#### **Course Description:**

This course provides an in-depth understanding of the principles and practices essential for effective management of construction projects. Students will explore project planning, scheduling, resource allocation, and risk management, with a focus on optimizing project performance and ensuring quality control. Emphasis is placed on the application of modern project management tools and techniques, including Building Information Modeling (BIM) and sustainable construction practices. Through case studies and practical exercises, students will develop the skills necessary to lead and manage construction projects from inception to completion, ensuring they are delivered on time, within budget, and to the required standards.

#### Learning Objectives:

By the end of this course, students will be able to:

- 1. Understand the fundamental principles of construction project management.
- 2. Develop comprehensive project plans, including schedules and resource allocation.
- 3. Apply risk management strategies to mitigate potential project issues.
- 4. Utilize modern project management tools and techniques, including BIM.
- 5. Implement quality control measures to ensure project standards are met.
- 6. Analyze and solve real-world construction project challenges.

#### **Topics Covered:**

#### 1. Introduction to Construction Project Management

- Overview of project management in construction
- Roles and responsibilities of a project manager
- 2. Project Planning and Scheduling
  - Developing project plans and schedules
  - Critical Path Method (CPM) and Gantt charts
- 3. **Resource Allocation and Management** 
  - Managing human, material, and financial resources
  - Resource leveling and allocation techniques

# 4. Risk Management

- Identifying and assessing project risks
- Developing and implementing risk mitigation strategies

#### 5. Quality Control and Assurance

- Quality management principles and practices
- Implementing quality control measures
- 6. Building Information Modeling (BIM)
  - o Introduction to BIM and its applications in project management
  - Benefits and challenges of using BIM

# 7. Sustainable Construction Practices

- Principles of sustainable construction
- Integrating sustainability into project management

# 8. Case Studies and Practical Applications

- o Analysis of real-world construction projects
- Lessons learned and best practices

- Assignments: Written assignments analyzing project management case studies (30%)
- **Examinations**: Mid-term and final exams testing knowledge of project management principles and techniques (40%)
- **Projects**: Group projects developing and presenting comprehensive project plans (20%)
- Class Participation: Active participation in discussions and case study analyses (10%)

# **Recommended Reading:**

- 1. "Construction Project Management: A Practical Guide to Field Construction Management" by S. Keoki Sears, Glenn A. Sears, and Richard H. Clough
- 2. "Project Management for Construction" by Chris Hendrickson
- 3. "Construction Project Management: An Integrated Approach" by Peter Fewings
- 4. **"A Guide to the Project Management Body of Knowledge (PMBOK Guide)**" by Project Management Institute (PMI)
- 5. "Building Information Modeling: Planning and Managing Construction Projects with 4D CAD and Simulations" by Willem Kymmell

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# Research Beyond Boundaries

