The Faculty of Engineering offers (4) postgraduate programmes: list the programmes:

- **Academic Programmes:**

- **Degree, Programmes, Dual degree**

Master of Science (M.Sc.), Sustainable Engineering Design and Construction, Dual degree

- **Professional Programmes:**

Master of Engineering (M.Eng.), Sustainable Engineering Design and Construction, Dual degree.

Name of the Programme:

The Sustainable Engineering Design and Construction Engineering

1. **Bachelor's degree required for each programme / Required overall grade or GPA:**

- **M.Sc.:** Grade of "C" (Good) or Post Graduate Diploma from Faculty of Engineering if the Graduate grade is lower than"C".
- **M.Eng.:** Grade of "D" (Pass).
- GPA to graduate is 2.70 (B-)

2. **Total number of credits for the programme is 36 creidts.**

3. **Programme structure**

The British University in Egypt
Programme & Module Specifications (2015-16)

Sustainable Engineering Design & Construction

Version 1.0

This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if full advantage is taken of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the Module Specifications and other programme documentation and online at http://learn.bue.edu.eg/

Note: throughout this document The British University in Egypt, BUE and the University are synonymous.

The accuracy of the information in this document is reviewed by the University and may be checked by external bodies.

Awarding body/institution
The British University in Egypt

Faculty
Engineering

Department
Architectural & Civil Engineering

Programme Co-ordinators
Prof. Ahmed Rashed / Prof. Maguid Hassan

Details of accreditation by a professional/statutory body
Accreditation will be sought from Supreme Council of Universities in Egypt (SCU).

Name of the final award
M.Sc. Master of Science in Sustainable Engineering Design & Construction
M.Eng. Master of Engineering in Sustainable Engineering Design & Construction

Programme title
Sustainable Design & Construction

Date at which the programme specification was written or revised
January 2015

1. Aims of the programme

- To provide students with a systematic understanding of the knowledge-base of Sustainable Design;
- To transfer students and practicing engineers into sustainable oriented designers and practitioners;
- To provide a wider notion of sustainable design beyond green ideals;
- To integrate architectural and/or structural sustainable concepts underpinning the design of future smart sustainable cities;
- To develop expertise and abilities to engage students in research and highly professional activities;
- To provide a programme which meets the educational requirements of all the appropriate professional institutions, both national and international?

Notes

The curriculum and regulations of this programme are required to satisfy the regulations of the Egyptian Supreme Council for Higher Education for engineering degrees.

Feedback on all aspects of this programme will be obtained via standard procedures from the University's framework for quality assurance, as defined in the Academic Quality and Standards Manual.

2. Relevant subject benchmark statements

- The National Academic Reference Standards (NARS) prepared by the engineering education sector of the Supreme Council of Universities (SCU).
- The National Qualifications Framework for higher education qualifications in England, Wales and Northern Ireland – January 2001 *http://www.qaa.ac.uk/academicinfrastructure/FHEQ/EWNI/default.asp;*
- The Quality Assurance Agency for Higher Education, "*Subject benchmark statement – Engineering",* ISBN 1 84482 526 4 (2006) *http://www.qaa.ac.uk/academicinfrastructure/benchmark/statements/Engineering06.pdf;*
- Engineering Council UK, "*UK-SPEC*" *http://www.engc.org.uk/ukspec/default.aspx* especially" The accreditation of Higher Education programmes" *http://www.engc.org.uk/documents/Accreditation_HE_Progs.pdf*;
- QAA guidelines for preparing programme specifications *http://www.qaa.ac.uk/academicinfrastructure/programSpec/default.asp*;
- The QAA's Engineering Subject Benchmark Statement *http://www.qaa.ac.uk/academicinfrastructure/benchmark/consultation/engineering_draft05.asp*;
- The American Accreditation Board for Engineering & Technology (ABET)

3. Intended Learning Outcomes

An overview of teaching, learning and assessment strategies to enable outcomes to be achieved and demonstrated

Learning and Teaching Methods

Throughout the programme students are encouraged to undertake independent reading both to supplement and consolidate what is being taught and to broaden their individual knowledge and understanding of the subject. Cognitive, practical and key skills are acquired, developed and reinforced continually throughout the programme. Targeted delivery may come from a variety of sources such as lectures, discussion sessions, research assignments and project work undertaken both in groups and individually.

Assessment

Learning outcomes are tested and assessed throughout the programme using a variety of forms that typically include a combination of unseen written examinations, unseen open book written examinations, written examinations based on previewed material, open-book written examinations based on laboratory exercises, oral examinations on laboratory exercises, oral examinations on project work, computer aided assessments, unseen coursework tests, open-book coursework tests, coursework assignments, design studies, research papers, laboratory logbooks, laboratory formal reports, project reports and/or papers, project logbooks, oral presentations and visual presentations.

Coursework forms a particularly important part of the assessment. This method of assessment can:

(i) be used to strongly motivate independent learning;
(ii) improve student research skills and methods;
(iii) Develop the comprehension and usage of technical English (particularly important for students at the BUE).

Examinations show how well the student can demonstrate their mastery of an area of scholarly knowledge by selecting appropriate material from memory and applying it to an unseen question in a limited time period. Coursework allows the student to demonstrate wider academic skills of focused scholarly research, analysis, synthesis and polished writing.

Practical skills are tested and assessed throughout the programme using a combination of coursework assignments, design studies, laboratory logbooks, project reports and/or papers, project logbooks and work placement reports.

A. Knowledge and understanding

On successful completion of this programme, students should be able to demonstrate knowledge and understanding of:

(A.1) the fundamentals of sustainability and sustainable development as applies at local, regional, national and global level;

(A.2) the ethical responsibility towards present and future generations

(A.3) concepts related to fundamentals of quality assurance in green design and construction;

(A.4) impact of the construction industry on the environment within the context of sustainable development;

(A.5) impact of various design elements on the overall sustainability of a proposed system;

(A.6) Green building rating systems and their relevance to a proposed project;

Skills and other attributes

B. Subject-specific cognitive skills

On successful completion of this programme, students should be able to:

(B.1) Analyse proposed projects in order to present the most optimum, reliable and smart solution for a given application;

(B.2) Formulate a given design problem within a sustainable framework;

(B.3) Propose, plan, develop and decision making for alternative sustainable solutions to conventional techniques and methods for design and construction;

(B.4) Display the skills necessary to define, conduct and report on a proposed project;

(B.5) Propose sustainable structural systems that ensure adaptability for future use including risk analyses and assessments;

C. Subject-specific practical skills

On successful completion of this programme, students should be able to:

(C.1) Implement concepts of optimum reliable design in architectural and structural systems;

(C.2) Employ professional report writing and evaluation for the concept of smart and/or intelligent buildings in the creation of sustainable designs;

(C.3) Implement the LEED rating system methods on a given project;

(C.4) Specify sustainable construction materials;

D. Key/transferable skills

On successful completion of this programme, students should be able to:

(D.1) Plan and implement the necessary steps in solving a research problem and the use of the information technology;

(D.2) Retrieve information from a variety of sources (library, internet);

(D.3) Appreciate sustainable design and development and the use of different effective communication;

(D.4) Monitor, plan and reflect upon personal, educational and career development, work and lead a team, time management skills and continuing self-learning .

4. Programme structure and requirements, levels, modules, credits and awards

Sustainable Engineering Design & Construction is a multi-disciplinary programme emerging from the Architectural & Civil Engineering Departments at the BUE. The programme awards two degrees the first is a Master of Science (M.Sc.) in Sustainable Engineering Design & Construction while the second is a Master of Engineering (M.Eng.) in Sustainable Engineering Design & Construction.

The programme is structured in four main components; the first is a set of pre-requisite modules, which are designed to bring the background knowledge of applicants from different

backgrounds to a required minimum. The second is a set of core modules, which are important to establish the basics of the subject area. The third is a set of elective modules that would aid in specializing the graduate in implementing core sustainability concepts in a given specialty area. Finally, the fourth component is a thesis in the case of M.Sc. award and research project in the case of M.Eng. This final component is expected to aid the graduate in integrating and implementing his/her gained knowledge in a selected application.

4.1 Pre-Requisite Requirements

Students are required to complete 9 credit hours of qualifying modules which are designed to bring students, from various backgrounds, to the necessary minimum level of knowledge which is deemed necessary for them to engage in a programme in sustainable design and construction. The details of the pre-requisite modules, in terms of the student's background, are listed in section 4.3 below.

4.2 Programme Requirements

Students are required to complete 36 credit hours in both degrees according to the following breakdown:

Requirements for M.Sc. Award

Module Type	Total Credit Hours	Number of Modules	%
Compulsory	9	3	25%
Elective	9	3	25%
Thesis	18	1	50%
Total	36	7	100%

Requirements for M.Eng. Award

Module Type	Total Credit Hour	Number of Modules	%
Compulsory	9	3	25%
Elective	21	7	58.3%
Project	6	1	16.7%
Total	36	11	100%

The details of the compulsory and elective modules are listed in section 4.3 below. The programme requirements comprise general requirements in the form of a Master's Thesis in the case of M.Sc. degree and a Research Project in the case of M.Eng. degree. The Master's Thesis is worth 18 credit hours while the Research Project is worth 6 credit hours.

4.3 Module Requirements

The following tables summarise the details of module requirements which are presented in the order: module code, module title, credit hours and relevant discipline. If a different version of the programme is approved from that currently offered at the University, a migration and transition strategy will be formulated so as to ensure that the students are not disadvantaged.

Pre- Requisite Modules (9 credit hours)

Code	Title	Credit hours
STDC501	Strategic Decision & Risk Management	3
STDC502	Environmental Assessment	3
STDC503	Research, Innovation & Communication	3

Core Modules (9 credit hours)

Code	Title	Credit hours
STDC601	Sustainable Energy & Material Use	3
STDC602	Principles of Sustainable Built Environmental	3
STDC603	Green Smart Materials	3

Elective Modules (9 credit hours for M.Sc. & 21 credit hours for M. Eng.)

Code	Title	Credit hours
STDC610	Smart Buildings	3
STDC615	Sustainable Urban Planning	3
STDC630	Structural Reliability	3
STDC631	Structural Control	3
STDC632	Structural Health Monitoring	3
STDC633	Retrofitting & Rehabilitation of RC Structures	3
STDC634	Structural Optimization	3
STDC635	Optimization of Substructures	3
STDC636	Constructability	3
STDC637	Non- Destructive Testing	3
STDC638	Advanced Composite Materials	3
STDC639	Advanced Analysis Techniques	3
STDC642	Sustainable Water & Environmental Sanitation	3
STDC643	Building Information Modelling	3
STDC644	Computer Algorithms for Engineering	3
STDC660	Sustainability & Heritage Value	3
STDC662	Lean Construction for Sustainability	3
STDC663	Sustainable Landscape Architecture	3
STDC664	Sustainability in Contemporary Cities	3
STDC665	Sustainable Urban Design	3
STDC666	Climate & Comfort	3
STDC668	Project Management for Architects	3
STDC669	Strategic Management for Construction	3
STDC670	Sustainability & Green Applications	3
STDC679	Special Readings	3

General Requirements (Master's Thesis for M.Sc. & Research Project for M. Eng.)

Code	Title	Credit hours
STDC680	Research Project	6
STDC690	Master's Thesis	18

5. Criteria for admission to the programme

The most usual route into this programme will be through successful completion of a Bachelor of Engineering in the area of Architecture or Civil Engineering.

The applicants should comply with all required criteria as per the Graduate Studies Academic Regulations of the Faculty of Engineering at BUE.

6. Information about assessment regulations

In accordance with the University's regulations on assessment and progression, as defined in the General Academic Regulations, Graduate Studies Academic Regulations and the Examination and Assessment Regulations.

7. What makes the programme distinctive

The BUE Master Degree in Sustainable Engineering Design & Construction is designed to allow graduates to develop their knowledge in the area of sustainable development and its implications on the design and construction of future smart cities.

The impact of construction activities on the environment is now well realized and understood. It is then the responsibility of current generations to develop new means of design and construction in a way that does not limit the development of new technologies while maintaining a safe sustainable environment for future generations.

This programme emphasizes the generic concept of sustainable design beyond green buildings. The programme is built on the notion that sustainable design implies *Reliable*, *Smart* and *Optimum* designs that employ *Recyclable* materials. Defined as such sustainable design is a multi-dimensional problem as opposed to the conventional one dimensional approach that only emphasised recyclable construction materials.

Depending on the type of award, the programme is designed to produce one of two graduates. The first is a quality researcher in the area of sustainable design who is capable of pursuing further post graduate studies at the PhD level in the same area of expertise or any other relevant area. While, the second is a sustainable oriented engineer who is capable of designing smart sustainable buildings, evaluating potential designs within a sustainable development backdrop and specifying construction materials for constructing sustainable smart cities.

8. Particular support for learning

E-learning web pages for all modules available on through the BUE e-learning environment. (http://elearning.bue.edu.eg)

9. Methods for evaluating and improving the quality and standards of learning

In accordance with the University's Quality Assurance procedures, as defined in the Academic Quality and Standards Manual [URL when available].

10. Changes from previous version of this programme

N/A

11. Migration strategy between programme versions

N/A

12. Glossary of terms (as used in this document)

Credit Hours	1 hour of lecturing is equivalent to 1 Credit Hour
NAQAAE	National Authority for Quality Assurance and Accreditation of Education (Egypt)
NARS	National Academic Reference Standards (Egypt)
ABET	American Accreditation Board for Engineering & Technology (USA)
QAA	Quality Assurance Agency (UK)
SCU	Supreme Council of Universities (Egypt)

14. Module Contents (English)

a. Pre- Requisite Modules (9 credit hours)

[STDC501] Strategic Decision & Risk Management
(3 credit hours, Pre-Req.: B.Sc. CIVL or ARCH)

Strategic decision; risk; uncertainty; certainty; risk identification; risk analysis; risk response; risk control; decision making process.

[STDC502] Environmental Assessment
(3 credit hours, Pre-Req.: B.Sc. CIVL or ARCH)

An introduction to SEA and EIA history and theories, contemporary techniques used in SAE and EIA worldwide; project life cycle; solid waste management; climatic impacts; soil and sub-soil impacts; assessment of sustainability; cultural and social impacts. The learning that students will achieve will come from the structured materials that form the basis of the Module; the self-administered questions that are contained within the Modules' Sections; and the assignments that are specified at certain points in the Module.

[STDC503] Research, Innovation & Communication
(3 credit hours, Pre-Req.: 501, 502, 503)

Creation and innovation in research; testing techniques and data acquisition; document design and layout; writing thesis and reports; writing research papers; use of alternative media for communication; effective presentation techniques

b. Compulsory Modules (9 credit hours)

[STDC601] Sustainable Energy & Material Use
(3 credit hours, Pre-Req.: 501, 502, 503)

Motivations for new materials for energy applications (higher efficiency, reduced costs; enhanced life times; lighter weights; reduced emissions; improved transmission, distribution and storage). Carbon capture transport and storage materials; advanced materials for hydrogen storage and transportation materials; materials for photo-voltaics; materials for solar cells; materials for fuel cells; improved life management and reliability of materials.

[STDC602] Principles of Sustainable Built Environment
(3 credit hours, Pre-Req.: 501, 502, 503)

Sustainability; Historical Context of Sustainable Development; Sustainable Design Strategies in Architecture; Urban Design Issues; Energy and Carbon; Construction Pollution and Waste; Lifecycle Considerations; the Use of Metrics and Rating Tools in Sustainable Design Practice; and Sustainability in Developing Countries.

[STDC603] Green Smart Materials
(3 credit hours, Pre-Req.: 501, 502, 503)

Selection and specification of green building materials; types of smart materials; use of non-toxic, recycled, and recyclable products, integration of these products into the

design process; up-to-date resource to meet today's green building challenges; from reducing waste and improving energy efficiency to promoting proper code compliance and safeguarding against liability claims; LEED requirements and other international and national codes.

c. Elective Modules (9 credit hours for M.Sc. & 21 credit hours for M. Eng.)

STDC610] Smart Buildings
(3 credit hours, Pre-Req.: 601, 602, 603)

Definition and components of a Smart Structural System; Smart Sensors; Smart Actuators; Smart Processors; Neural Networks; Fuzzy Inference Systems; Genetic Algorithms; Applications of Smart Structural Systems. Intelligent building ideas; designs; concepts; trends; philosophies; Influence of intelligent design ideas on the final building envelope (internally and externally); Methods of assessments and their relevant criteria with a projection on future trends Internationally and Locally.

[STDC615] Sustainable Urban Planning
(3 credit hours, Pre-Req.: 601, 602, 603)

Upgrading strategies, site survey and appraisal, storm and sullage drainage, water supply, sustainable sanitation, access and paving, sustainable solid waste management, operation and maintenance, sustainable power supply and lighting.
Within the context of sustainable development; the content of this module will cover the issues related to justifications for planning activity, rational planning perspectives, planning and the market, ethical planning debates, the outline history of urban design; skills of architectural observation and description; techniques for notation and analysis of urban space, city image; conservation and the historic environment; design policy and guidance; design and access statements, urban design and climate change mitigation/ adaptation. The lectures and tutorials of the module works, students will be able to apply and elaborate the knowledge from their previous studies in the working field of planning and urban design.

[STDC630] Structural Reliability
(3 credit hours, Pre-Req.: 601, 602, 603)

Uncertainty and Random Variables; Structural Analysis Incorporating Uncertainty; Component and System failure modes; Reliability of Structural Elements; Reliability of Structural Systems; Reliability-Based Design; Models of Structural Loads and their combinations; Fuzzy Set Theory & Fuzzy Logic.

[STDC631] Structural Control
(3 credit hours, Pre-Req.: 601, 602, 603, 610)

Motivation for Structural Control; Classification of Structural Control; Passive Control; Active Control; Hybrid/Semi-Active Control; Sensor Technology; Intelligent Control.

[STDC632] Structural Health Monitoring
(3 credit hours, Pre-Req.: 601, 602, 603, 610)

Structural Health Monitoring Vs. Control; Vibration-based Techniques; Fiber-Optic Sensors; Piezoelectric Sensors; Capacitive Methods; Applications of Structural Health Monitoring.

[STDC633] Retrofitting and Rehabilitation of RC Structures
(3 credit hours, Pre-Req.: 601, 602, 603)

Retrofitting, rehabilitation and protection of RC; Sources and signs of RC defects in different elements; In situ retrofitting and rehabilitation programme; Different materials used in retrofitting, rehabilitation and protection; Different methods used in retrofitting, rehabilitation and protection; Design of repair retrofitting, and rehabilitation work.

[STDC634] Structural Optimization
(3 credit hours, Pre-Req.: 601, 602, 603, 639)

Design optimization procedures; Formulation of a general nonlinear optimization problem (design variables, objectives, constraints); Multi-objective optimization; Viewing and interpretation of optimization results; Sensitivity analysis; Size & Shape optimization; Probabilistic design optimization; Optimization in structural dynamics; Using approximations for fast re-analysis in structural dynamics; Advancements in seismic analysis and design where optimization algorithms can be implemented.; Implementation of optimization algorithms in earthquake engineering problems, simulation issues for the accurate prediction of the seismic response of structures.

[STDC635] Optimization of Substructures
(3 credit hours, Pre-Req.: 601, 602, 603, 634)

Sustainable geotechnical designs; limit state design; load and resistance factors design; LRFD calibration framework; serviceability limit state; resistance factors for deep foundations; resistance factors verification; sustainable foundations – applications; sustainable retaining walls – applications.

[STDC636] Constructability
(3 credit hours, Pre-Req.: 601, 602, 603)

Nature of the construction industry; Constructability philosophy; Constructability concepts; Constructability review; Constructability and Sustainability; Benefits of Constructability; Barriers to Constructability adoption; Integrating Constructability in design and construction.

[STDC637] Non-Destructive Testing
(3 credit hours, Pre-Req.: 601, 602, 603)

Non Destructive Testing of construction materials and different structural elements; In situ NDT programme; Different methods used in NDT of structural elements; methodology, applications, advantages and disadvantages, and limitations; Evaluation and interpretation of NDT results.

[STDC638] Advanced Composite Materials
(3 credit hours, Pre-Req.: 601, 602, 603)

Fibre Reinforced Plastics (FRP) material; Resins, Types of; Thermoplastic; Thermo-set; Unsaturated polyester; Epoxy; Vinyl-ester; methods of production; setting of; gelations, normal curing, elevated temperature curing, glass temperature, uses and applications; Fibres, Types of; Carbon; Glass; Aramid; methods of production; properties: mechanical; physical; chemical; etc..; uses and applications; fabrics; Design of FRP materials, Mechanical properties, rule of mixing, inverse rule of mixing, stress-strain relations; Methodology of production of FRP and ACM, advantages, disadvantages, materials, and products; The use of FRP in civil and architectural applications, Compare existing construction materials to FRP as a construction material, and design of FRP as a strengthening and rehabilitation material for different structural elements.

[STDC639] Advanced Analysis Techniques
(3 credit hours, Pre-Req.: 601, 602, 603)

The Fundamental principles of digital computing and the implications for algorithm accuracy and stability, error propagation and stability; The solution of systems of linear equations, including direct and iterative techniques; The Roots of equations and systems of equations; The Numerical interpolation; The differentiation and integration; The fundamentals of finite-difference solutions to ordinary differential equations; The error and convergence analysis.

[STDC642] Sustainable Water and Environmental Sanitation
(3 credit hours, Pre-Req.: 601, 602, 603)

Water, sanitation and well-being; sustainable water resources; environmental pollution; water quality, sustainable water safety plans and sanitary survey inspections; groundwater; open wells, boreholes and spring protection; water lifting; water storage; rainwater harvesting; surface water sources; water treatment; water distribution, drainage and sewerage systems; on-site sanitation; sustainable wastewater treatment; sustainable solid waste management; hygiene practices and promotion.

[STDC643] Building Information Modelling
(3 credit hours, Pre-Req.: 601, 602, 603, 636)

Building Information Models; Modelling Structural Elements; Modelling Architectural Elements; Modelling service and utility systems; Extracting a 3D model; Introducing planning information; Analysis & Design results; Applications of Building Information Modelling.

[STDC644] Computer Algorithms for Engineering
(3 credit hours, Pre-Req.: 601, 602, 603)

Data structures; Relational database representations of engineering data; Algorithms for the solution and optimization of engineering system designs (greedy, dynamic programming, branch and bound, graph algorithms, nonlinear optimization); Introduction to complexity analysis; Efficient implementations of algorithms; Object-oriented software design and development.

[STDC660] Sustainability & Heritage Value
(3 credit hours, Pre-Req.: 601, 602, 603)

Heritage meaning; types; Materials; Characterization and Methods of Analysis and Interpretation; Sustainable Strategies; including Conservation and Use Project Planning; Management and Maintenance principals; approaches and its applications on historical buildings.

[STDC662] Lean Construction for Sustainability
(3 credit hours, Pre-Req.: 601, 602, 603)

Nature of the construction industry; Lean Theory; Lean Principles; Lean Construction; Lean Process Management; Benefits of Lean Construction; Barriers to Lean Construction adoption; Role of Lean Construction in achieving sustainability in construction; Integrating Lean Construction in design and construction firms.

[STDC663] Sustainable Landscape Architecture
(3 credit hours, Pre-Req.: 601, 602, 603)

The natural dynamics of ecosystems, Contemporary Landscape Theory, Landscape Perception, sustainable landscape construction, Planting Design Theory, Place - Identity and the Landscape, Advanced Landscape Ecology, Landscape Preservation, Landscape management, Design project.

[STDC664] Sustainability in Contemporary Cities
(3 credit hours, Pre-Req.: 601, 602, 603)

Elements of Urban Form; Modernist City Design; Traditional City Design and the Modern City; Green City Design and Climate Change; the Intelligent City; Modelling Cities on Ecosystems; Economic Viability; Sense of Place; Public Participation; and Neighbourhood Design and Sustainable Lifestyles.

[STDC665] Sustainable Urban Design
(3 credit hours, Pre-Req.: 601, 602, 603, 615)

Sustainability; Sustainable development; sustainable design brief; sustainable urban design; environmental architecture; sustainable cities and sustainable communities; Urban microclimates and the urban heat island and their environmental impact on cities.

[STDC666] Climate & Comfort
(3 credit hours, Pre-Req.: 601, 602, 603)

Introduction to weather and climate; climate classification; units of heat and energy; temperature, sensible and latent heat capacity, and the psychometric chart; Thermal comfort: personal variables; average 'U' values' heat transfer; and ventilation heat loss; Concepts of solar analysis, annual sun path diagram and shading device design.
Units of light: luminous flux; luminous intensity; inverse square law; cosine law; luminance. Visual comport. Artificial lighting: light output ratio; lumen design method; daylight factor; components of daylight factor; design of window shading devices. Fundamentals of Acoustics, external and internal sound propagation, noise, and the Acoustic design of internal spaces.

[STDC668] Project Management for Architects
(3 credit hours, Pre-Req.: 601, 602, 603)

Introduction to Project Management; the Construction Process; Project Organisation; Project Planning; Construction Scheduling; Estimating; Budgeting and Controlling Projects; TQM and structured problem solving; Motivation and Incentives; Health and safety in Construction and Project Communication.

[STDC669] Strategic Management for Construction
(3 credit hours, Pre-Req.: 601, 602, 603)

Construction and its Business Environment; the External Environment; the Internal Organisation; Strategy Formation; Strategy Implementation; Strategies for International Construction; Strategic Leadership; Techniques for Strategic Planning; Continuous Improvements; Introduction to CSR and Cultural Considerations.

[STDC670] Sustainability & Green Applications
(3 credit hours, Pre-Req.: 601, 602, 603)

Green Technologies: ideas, designs, concepts, trends, philosophies; influence of building performance and green issues (Wind Turbines, Photo-Voltaic, Green Roofs and Walls, smog eating architecture and Bio mass ...etc.) on the final building envelope.

[STDC679] Special Readings
(3 credit hours, Pre-Req.: 601, 602, 603)

By departmental approval. Given when interest develops. Topics may include any state-of-the-art subject matter that is relevant to the analysis and/or design aspects of sustainable systems and their components.

d. General Requirements (18 credit hours for Master's Thesis for M.Sc. & 6 credit hours for Research Project for M. Eng.)

[STDC680] Research Project
(3 credit hours, Pre-Req.: 601, 602, 603)

To be proposed and approved by academic advisor.

[STDC690] Master Thesis
(3 credit hours, Pre-Req.: 601, 602, 603)

To be proposed and approved by academic advisor.

Contact information

E-mail : Weam.Ghaleb@bue.edu.eg Ext. :2433

For more information

1. Required documents: https://www.bue.edu.eg/general-requirements
2. English Level: https://www.bue.edu.eg/uploads/editor/PG%20English%20Level_Web%20site.pdf
3. PG Tuition Fees: https://www.bue.edu.eg/tuition-feess
4. PG Scholarship Scheme: https://www.bue.edu.eg/postgraduate-scholarships
5. Application link: https://pgs.bue.edu.eg/registration/Default.aspx