



Module Specification

Technology 6.2 - Advanced Structures and Fire Services

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Part 1: Information

Module title: Technology 6.2 - Advanced Structures and Fire Services

Module code: UBLMY8-8-M

Level: Level 7

For implementation from: 2023-24

UWE credit rating: 8

ECTS credit rating: 4

College: College of Arts, Technology and Environment

School: CATE School of Architecture and Environment

Partner institutions: None

Field: Architecture and the Built Environment

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: The module introduces the students to the new contemporary and emerging technologies and their implications on the design, servicing, construction, maintenance and management of middle and high rise buildings and complex of buildings for different usages in different situational contexts.

Features: Not applicable

Educational aims: See Learning Outcomes

Outline syllabus: The module will specifically look at 5 main topics in the following areas:

Topic 1 : ADVANCED STRUCTURES (Terms 1 and 2)

Review of Structural forms

Review of Structural Support Systems

Review of Loading on buildings and Structural Behaviour

Load evaluations on slabs, beams, columns

Soil investigations and Foundations, Deep Foundations

Basements – foundations, excavation and shoring, water table and de-watering, water proofing and internal or external tanking

Slab Systems

Topic 2 : STRUCTURAL DESIGN OF MIDDLE and HIGH RISE BUILDINGS

Loading and principles of structural analysis of middle and high rise buildings

Structural implications of middle and high rise buildings – wind loads and wind actions, designing for wind forces and seismic effects

Structural frames, shear walls, multi- level basements and structural issues related to basement construction

Foundations for middle and high rise buildings, de-watering and water proofing

Tower and podium, and issues related to differential settlement of the tower

Structural concepts for towers: framed structure, gridded structure, tube within a tube, shear wall concept, suspension concept, towers held in tension

Structural transfer floors and their implications

Structural implications of Integrating vertical circulation, services and fire safety with the structure

Modifications to structure to carry out maintenance works

Design of the tower for natural and man-made disasters

Topic 3 : SPECIAL BUILDINGS and THEIR STRUCTURES

Stadiums/Sports facilities and Recreational Centres and their structural implications (column free space for sight of the pitch or action area, use of arch, cantilever/suspension principle to support the roof, support structure for seating, drainage of pitch etc.)

Auditoriums, Concert Halls, Performance Arts Centres: iconic forms and their structural supports

Large/Long span structures: railway terminals, airports, air craft hangers, ware houses and factories and their structural implications, stabilising the length of the building

Cantilever Structures, Tensile Structures, Suspension Structures, Space/Surface Structures, Pneumatic Structures and their structural implications and structural details

The use of Steel, Pre and Post tensioned concrete, Laminated Timber, Glass, Paper and Board, Rammed Earth as structural materials; their structural implications; construction and detailing

Smart materials and related structural technology

Topic 4 : STRUCTURAL DESIGNS FOR DISASTERS

Design of buildings in environmentally sensitive areas: designing for cyclones, designing for earth quakes, designing for floods and tsunamis and their structural implications; construction and detailing

Designing for man – made disaster : factors to consider, limiting the scope, structural implications of such a disaster, construction and detailing

Topic 5 : ADVANCED BUILDING SERVICES 4 – FIRE SAFETY (Term 2)

Understanding Fire: What is fire, the threat from fire, controlling of fire, fire suppression

Fire Concepts: Structural fire protection – zoning, compartmentalizing; Mobility; Stages of fire growth; Travel distance; Exit width: Transmission of heat or Fire load

Designing for Safety of Life: Required Evacuation facilities; Principles of evacuation; Evacuation concepts – mobility, travel distance, number of exits , fire escapes/stairways, alarms, signage; Fire drills and awareness; Fire regulations and design considerations

Designing for Structural Protection: The effects of fire on building; Stability of the structure , materials and performance and rating in relation to fire safety standards; Prevention of internal fire spread; Prevention of external fire spread

Mitigating the Fire Threat: Manual and automatic fire detection systems – smoke and heat; Portable fire extinguishers; Hose reel systems; Dry and Wet riser systems; Sprinkler systems; Drencher systems; External hydrant systems; Fire doors , exits and Fire signage; Fire sumps

Fire Control in special situations: Middle and High rise buildings, building complexes, public buildings, sports facilities, hospitals , hotel, industrial buildings etc.; Fire Certificate and the City Fire Brigade

Part 3: Teaching and learning methods

Teaching and learning methods: See Assessment

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Awareness:

Of the innovative concepts of contemporary and emergent technologies and their influences on design, servicing, construction, maintenance and management of buildings.

MO2 Awareness:

Of new trends in time based architecture and their perceptions and influences on the design, servicing, construction, maintenance and management of buildings.

MO3 Knowledge:

Of the role of technology in the design and construction processes of buildings.

MO4 Critical Understanding:

Of the principles of new contemporary and emergent structural systems, fire safety, specialised services systems and their applications, advantages and disadvantages in middle and high rise buildings and different usages and situational contexts, and the complexities of managing and maintaining buildings.

MO5 Ability:

To integrate the understanding of structural system, servicing aspects of building and their related choice of materials, process of assembly and maintenance

aspects in the design of middle and high rise buildings and complex of buildings for different usages in different situational contexts.

Hours to be allocated: 80

Contact hours:

Independent study/self-guided study = 27 hours

Face-to-face learning = 53 hours

Total = 80

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/index.html) via the following link <https://uwe.rl.talis.com/index.html>

Part 4: Assessment

Assessment strategy: Strategy:

Being a technical module where students are required to demonstrate key analytical and problem solving skills under time constraints, an unseen exam is deemed to be an appropriate assessment tool for the controlled element.

The coursework requires the students to demonstrate, throughout the academic year, that they understand how these building technology and services concepts introduced in the lectures will and can be applied in practice.

The Assessment:

Examination – The examination is used to concentrate students' attention on assimilating the knowledge and mastering the key subject areas contained within the module.

Coursework Reports: The coursework is used to integrate strands of knowledge presented as separate topics and to develop students' academic writing with particular emphasis being placed on the managing and referencing of evidence based work.

Formative Feedback will be given to drafts of the coursework and to the final coursework piece prior to submission.

Assessment tasks:

Examination (First Sit)

Description: Written Examination

Weighting: 60 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Written Assignment (First Sit)

Description: Individual written coursework submission which will cover Advanced Structures and Fire Services.

Weighting: 40 %

Final assessment: No

Group work: No

Learning outcomes tested: MO4, MO5

Examination (Resit)

Description: Written Examination

Weighting: 60 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Written Assignment (Resit)

Description: Resubmission of individual written coursework submission which will cover Advanced Structures and Fire Services.

Weighting: 40 %

Final assessment: No

Group work: No

Learning outcomes tested: MO4, MO5

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Architecture and Environmental Design [SriLanka] MArch 2022-23