# Class Description Form

## CL977  STRUCTURAL DESIGN

<table>
<thead>
<tr>
<th>Class Registrar: Andrew Briggs</th>
<th>Taught To (Course): MSc in Civil Engineering</th>
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</thead>
<tbody>
<tr>
<td>Other Lecturers Involved: N/A</td>
<td>Credit Weighting: 20</td>
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<tr>
<td></td>
<td>Semester: 1</td>
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<tr>
<td>Assumed Prerequisites: All compulsory civil engineering classes up to the end of 3rd year or equivalent</td>
<td>Compulsory/ optional/elective class</td>
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<td>Academic Level: 5</td>
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## Class Format and Delivery (hours):

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Project</th>
<th>Assignments</th>
<th>Private Study</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>4</td>
<td></td>
<td></td>
<td>100</td>
<td>80</td>
<td>200</td>
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## Educational Aim

This class aims to introduce students to the conceptual and detailed design of whole structures. Students work in small groups to prepare the conceptual design of a multi storey building, followed by preparation of an individual coursework for the detailed design of typical elements including analysis and technical design.

## Learning Outcomes

On completion of the class the student is expected to be able to:

- **LO1** Knowledge of design processes and methodologies
- **LO2** Ability to apply quantitative methods and use computer software in order to solve structural engineering problems.
- **LO3** Understanding of appropriate codes of practice and industry standards
- **LO4** Ability to work in a group on a complex design brief

(UK SPEC suggests no more than 4 learning outcomes per class. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the course specifications.)

## Syllabus

The class will teach the following:

- The design process
- Preparation of a requirements statement
- Conceptual structural design
- Option analysis
- Loadings and Eurocode load combinations
- Preliminary sizing of structural elements
- Yield line analysis – two way spanning slabs
- Overall stability of structures
- Sub frame analysis
- Reinforced concrete columns
Assessment of Learning Outcomes

Criteria

For each of the Class Learning Outcomes the following criteria will be used to make judgements on student learning:

[Note: Criteria break the LO down into ‘teachable’ elements but do not become syllabus orientated i.e. no mention of CAD package names, components etc.]

LO1 Knowledge of design processes and methodologies

C1 Appreciation of the IStructE Design Process and RIBA Plan of Work
C2 Able to prepare a requirements statement
C3 Knowledge of methods for option analysis

LO2 Ability to apply quantitative methods and use computer software in order to solve structural engineering problems.

C1 Detailed understanding of structural behaviour and loadings applied to structures
C2 Able to carry out structural analysis using computer software and verify the results
C3 Able to carry out initial sizing of structural elements for conceptual design purposes

LO3 Understanding of appropriate codes of practice and industry standards

C1 Able to carry out technical design of structural elements in accordance with the Eurocodes
C2 Able to calculate loadings onto structures in accordance with the Eurocodes or British Standards
C3 Able to prepare a detailed structural design report including text, sketches, calculations and drawings

LO4 Ability to work in a group on a complex design brief

C1 Able to develop a complex design brief
C2 Able to work on delegated tasks and coordinate their work with others in the group

The standards set for each criterion per Class Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

12 Principles of Assessment and Feedback

(on Learning & Teaching web pages: www.strath.ac.uk/learnteach/teaching/staff/assessfeedback/12principles/)

Please state briefly how these are incorporated in this class.

- The project activities are spread throughout the semester
- Feedback to each group is given on a weekly basis so that they have the opportunity to improve their work on an ongoing basis.
- The design review in week 4 has minimal marks but creates a deadline which encourages students to start work on the conceptual design early in the semester. The review also allows feedback to be given at this key point in the project so that students can incorporate the advice given into their conceptual design report.
- The group project encourages peer dialogue covering many issues and also, structured discussion with the teacher.
- Assessment covers a range of skills and abilities (oral presentations, writing, sketching, structural calculations and autocad drawings) so that students who have strengths in some skills, but not others, can still do well in this class.
- Coursework is broken down into the specific topics to be covered and the proportion of the overall marks allocated to each topic is specified.
- Written general feedback comments given to students in the previous year is made available so that students are aware of which parts of an assignment are likely to require the most effort.
- Examples of the presentation standard required for calculations and engineering drawings plus model answers to assignments in earlier years are provided on MyPlace.
Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>L/Outcomes</th>
<th>Examinations</th>
<th>Courseworks</th>
<th>Projects</th>
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<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Duration</td>
<td>Weighting</td>
</tr>
<tr>
<td>LO1, LO2, LO3, LO4</td>
<td>3</td>
<td>100%</td>
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Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam/coursework/project as required.

Coursework / Submissions deadlines:
- DP41 Conceptual Design Review: week 4
- DP42 Conceptual Design Report: week 5
- DP43 Detailed Design Report: week 12

Resit Assessment Procedures:
Coursework to be completed before the August exam diet.

PLEASE NOTE:
Students need to gain a summative mark of 50% to pass the class and must make a serious attempt at each assessment. Students who fail the class at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of coursework.

Recommended Reading
An extensive list of references for specific technical topics is provided in the briefing notes for the building design project.

Additional Student Feedback
(Please specify details of when additional feedback will be provided)

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<tr>
<th>Date</th>
<th>Time</th>
<th>Room No</th>
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Session: Student feedback will be provided weekly to groups of 5 or 6 students at 20 minute tutorial appointments with additional feedback given to the whole class at some lectures when necessary.

Approved:

Course Director Signature:

Date of Last Modifications: July 2013

(Updated November 2010)
**CLASS TIMETABLE**

**Class Code:** CL977  
**Class Title:** Structural Design

**Brief Description of Assessment:**
- DP41: Conceptual design review – group assessment
- DP42: Conceptual design report – group assessment
- DP43: Detailed design report – individual assessment

**Assessment Timing:**
Indicate on the table below the Start/Submission dates for each Assignment/Project and the timing of each Exam/Class Test(s).

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<th>WK4</th>
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<th>WK6</th>
<th>WK7</th>
<th>WK8</th>
<th>WK9</th>
<th>WK10</th>
<th>WK11</th>
<th>WK12</th>
<th>Exam Period</th>
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<tr>
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<th>WK9</th>
<th>WK10</th>
<th>WK11</th>
<th>WK12</th>
<th>Exam Period</th>
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