CE315 GROUP DESIGN PROJECT

Co-ordinator: Professor Chris Wise, Room 328A, c.wise@imperial.ac.uk

Lecturers: Professor C.M. Wise, (CMW) and Mr. E. McCann (EMcC)
Professor Mike Bell (MB)
Visitors from industry
At least one member of staff from each section of the Department

Construction Partner: John Doyle Construction

Constructionarium location: CITB, Norfolk

Design Studios: TBA in College

Structure: see below

Links: see Introduction

Introduction

The third year group design project allows students to develop their understanding of the principles of design and construction covered in Years 1 and 2. The module provides an opportunity for students to work together on a significant piece of creative holistic design, in a project context. This course also includes a significant construction element.

The projects will be run by a Steering Group under the leadership of Prof. Wise, Chair of Civil Engineering Design. The organisational aspects of the design projects are handled by Prof Bell who also chairs the client crit panels.

Students have been advised that they will need both curriculum and non-curriculum skills to be successful in the design and construction projects. This advice was included in years 1 and 2 (in the Creative Design Green Book entries, and in class). The main aim of this advice is to reduce the time taken for the learning curve and give the students the most satisfying exploration through their projects.

Module Structure

- The project will be carried out in groups in the summer term of the Third Year, over a five week period (175 hours). Four of the five weeks will be spent on the group design project. The design projects are centred around a permanent studio environment in College, with design development workshops and constructive criticism sessions (crits). Once a week, students will take part in interim crits, which will provide feedback for the next stage of the project and also serve as learning milestones for assessment. Team working and communication skills within the group and to third parties will be encouraged, and assessed.
- A high degree of initiative is expected from students, and for this reason the project briefs will contain a relatively limited amount of information (as is common in practice). Students are expected to develop the project brief at the same time as they explore their design proposals, in an iterative way.

- The project also includes one week of construction based activities, also in groups, known as the ***Constructionarium***.

SYLLABUS

The 3rd year project is carried out in design teams. The emphasis is on engineering creativity, design understanding, practicality, appropriate use of technical knowledge, team working, organisation and communication skills. Each team will do a different project. All projects are inter-disciplinary, and have industry involvement in addition to the IC academic staff. Your design group will be given a studio workspace in college, and we expect that most or all of the project work will be carried out in the studio space.

We'd like you to produce as good a piece of "real" engineering design as possible, using your creativity and design understanding (from Creative Design 1 and 2), applied engineering science (from the academic taught course), and complementary team working and communication skills (from Engineering in Context). We also expect a practical understanding of construction, and, as advised you will have needed to spend your time in the 3 years leading up to the Constructionarium wisely to develop this.

In common with the real world, we expect you to use industry standard CAD, analysis, and presentation tools where these are available in the college.

In addition, we want both design and construction projects to be a proving ground for ideas of:

- Cost
- Value
- The business case
- Environmental impact and sustainability
- Construction sense
- Risk assessment and mitigation
- Health and safety strategy/CDM

You will be asked to develop all these things whether or not the brief explicitly calls for them.

We expect your team to:

- present a well-argued case
- be self-critical
- make value-judgements,
- be self-reliant
  and
- self-edit.

The project should be regarded as a great chance for you to experience a (nearly) real design project at first hand.

You will be working in groups from the beginning, in the same groupings for both the design and construction projects. Just as in real projects, it is vital that the group

members support each other, as the success of the groups depends on everyone contributing fully according to their strengths. There should be no competition within the group……you stand or fall as a team, not as individuals. You should take a little time getting to know each other's technical and practical and social skills so that you can use them to complement each other and to cover for areas of weakness.

Client and crit sessions
Your client for the design project will be a crit panel, made up of the overall coordinator Prof Mike Bell; your project supervisor; and invited industry critics. The project briefs are short and your client (which is primarily a lay body) may not have expressed itself particularly clearly or completely and certainly may not understand the implications of all its requests to you. An important part of the early stage of the project is to develop and expand the client's brief, and fill in the gaps. As the design team, you should apply your expertise to do this, and you should work with your client to make sure you both agree what is needed. You are required to contact your supervisor to arrange a project briefing at the earliest convenient opportunity.

Each week, your design team has to make a milestone presentation of progress to your client, at an **interim crit**. These mandatory sessions are a similar to project progress meetings, and are intended to allow a fair and frank exchange of views and give you a chance to discuss alternatives, air suggestions and explain problems so that you can get feedback to help the next stage of your work. Crits last 60 minutes. Interim crits are assessed because we are interested as much in the design process as in its result (believing that a well considered process will lead to a good design)….and also we want to remove the temptation to do everything at the 11th hour. As a primarily lay client, the panel will be able to give feedback but is unlikely to be able to provide you with an answer….it's your job to present your ideas clearly, listen and discuss the feedback and then, as the design team, use it to come up with a design.

Design development sessions:
Mandatory **design development** (DD) sessions, also about 60 minutes long, are held a day or two after the interim crits. This is in response to feedback that some students find the crits unnerving and sometimes difficult to act upon. To help evaluate the client's remarks, Ed McCann and Chris Wise will assist each group in the design development sessions in which their contribution is aimed at helping you to interpret and develop the client's wishes. In these sessions, which are not marked, Ed and Chris work as engineering facilitators alongside students to deal with the outcomes of their crits. Although it may be of some use technically, the main purpose is try to keep the design process on track. It is expected that the project teams summarise their concerns in the 24 hours following the interim crits and present them briefly at the start of the dd sessions, with key open questions highlighted. You should note that Chris and Ed do not attend the interim crit sessions, and do not expect to be treated as part of the client, but rather as a non-executive but experienced part of each team. These sessions are generally held on Fridays.

Final crit
At the end of the project, you will be expected to present your project as a team during a final crit in front of the whole year. You can do this in whatever form you like….using sketches, drawings, sketch models, or through other appropriate media such as a project intranet site, computer graphics, overheads or slides.

Final report
Each team will also be expected to prepare and submit an A3 summary report explaining the basis of your design, the relevant steps in your design thinking

whether included or discarded in the final project, a short diary of events, and your final design and conclusions, including key decision-making calculations (in an appendix).

Constructionarium
There is also a strong construction element in this part of the M.Eng course, beginning in the first week of the project period, when everyone will take part in the Constructionarium. Attendance at the Constructionarium is mandatory and a register will be kept. The Constructionarium will be run and assessed jointly with our industrial partners, currently the contractor John Doyle PLC led by Stef Stefanou and Peter Goring. You will be briefed separately on the details of this during an introductory day in college.

Assessment
Assessment is designed to recognise the project process as well as the end result. As the project is about both analysis and synthesis, you will be given little credit for derivative work, whether web-derived, or obtained from the work of others connected with the project. In the past, those who have presented a project which is a summary of the work of others have scored poorly due to a luck of team insight into the reasons lying behind their proposals.

You stand or fall primarily as a team. This is a very important difference from normal individual performance and assessment.

Course marks for the 5 week course are awarded as follows:

Constructionarium **	20% of total
Design project crit 1	15%
Crit 2	15%
Crit 3	15%
Final Crit	20%
Design project A3 report	15%

Criteria for assessment will include:

- your organisation and participation in the project as a complementary and mutually supportive group, not as a series of individuals,
- the practical evolution and implementation of the design and design process,
- the way in which you unlock the key to the project,
- the quality of the end product,
- your developing understanding of the key engineering issues,
- the standard of communication and explanation during the crit sessions.

** Constructionarium marks are awarded by a panel made up of contractors, consultants and relevant academic staff, and will be further broken down on the basis of:

Construction approach and standard	60% of marks
Cost management	20%
Project management	20%

Moderation

In past years the project moderation group have allowed themselves to adjust individual marks up or down by up to a grade to acknowledge exceptionally good or poor performance relative to the rest of the group. This has generally happened with 3 or 4 people per year. Those who fail to perform at a satisfactory level in the eyes of the group, client and faciltators will be dealt with accordingly. In the past, extreme examples of “taking a ride” have resulted in a zero mark for that individual for the whole project.

Design Project Learning Outcomes

- Team working and communication skills within a group, and with third parties.
- Interpretation of a brief.
- Developing a project from a brief.
- Exploring design proposals in an iterative way.
- Presenting a competent “professional” conclusion both verbally and in report form

Constructionarium Learning Outcomes

- Ability to assess a site
- Understanding of site safety
- Ability to plan a construction project
- Ability to cost manage a construction project
- Ability to work with common construction materials safely
- Ability to finish on time and to budget!