REM master basic syllabus

Title:
NM960 Finite Element Analysis of Floating Structures

Credit value:
5 ECTS

Mandatory/Optional:
Mandatory

Semester:
1

Lecturer/s:
Erkan Oterkus

University:
University of Strathclyde

Department:
Naval Architecture, Ocean and Marine Engineering

Rationale:
This module aims to provide students with a theoretical and practical knowledge of the finite element method and the skills required to analyse marine structures with ANSYS graphical user interface (GUI).

Objectives:
To provide students with:

1. *An understanding on the basics of finite element analysis*
2. *An understanding of how to perform finite element analysis by using a commercial finite element software*
3. *An understanding on specifying necessary input parameters for the analysis*
4. *An understanding on how to visualize and evaluate the results*

Skills: *(according to the list of skills provided)*

Subjects skills	REM Master Skills						
	L2.1	L2.2	L2.3	L2.4	L2.5	L2.6	L2.7
L3.1. An understanding on the basics of finite element analysis	X	X		X			X
L3.2. An understanding of how to perform finite element analysis by using a commercial finite element software		X	X		X		
L3.3. An understanding on specifying necessary input parameters for the analysis		X	X		X		
L3.4. An understanding on how to visualize and evaluate the results		X			X	X	X

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Teaching and learning methods:
Description of the methodology: lectures, lab, group presentations….

- *Workload is evenly spread throughout the module.*
- *Students will receive feedback on each assessment in three weeks following the deadline for submission.*
- *Worked example/tutorial sheets will be made available to support the class.*
- *Lecturers will ask students to utilise course criteria to evaluate their own and to describe the qualities of their best work through group discussion.*
- *Lecturers will consistently provide specific feedback tied to predefined criteria, with opportunities to revise or apply feedback before final submission. Feedback will be corrective and forward-looking, rather than just evaluative.*

- *Lecturers will consistently invite students to discuss the formative learning process together. This practice primarily revolves around midterm evaluations and small group feedback sessions, where students reflect on the course and instructors respond to student concerns. Students can also identify examples of feedback comments they found useful and explain how they helped.*
- *Lecturers will make the marking criteria for coursework very clear to students.*
- *Lecturers will provide truly unbiased summative assessment by using bling grading techniques.*

Allocation of student time:

	Attendance (classroom, lab,…)	**Non attendances (lectura preparation, self study,…)**
Lectures	22 hours	22 hours
Tutorials	11 hours	10 hours
Private study		60 hours

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Assesment:

For each of the Module Learning Outcomes (skills) the following criteria will be used to make judgements on student learning:

LO1 An understanding on the basics of finite element analysis
C1 Students will be expected to discretize the problem domain and obtain the finite element model.

LO2 An understanding of how to perform finite element analysis by using a commercial finite element software
C1 Students will be expected to use the Graphical User Interface (GUI) features of a commercial software

LO3 An understanding on specifying necessary input parameters for the analysis
C1 Students will be expected to know the necessary input parameters to analyse the problem and how to input them to the software through GUI

LO4 An understanding on how to visualize and evaluate the results
C1 Students will be expected to visualize the results by using GUI such as deformed configuration, displacements, strains and stresses and judge the reasonability of the results

There will be 3 class tests and 1 assignment. The class tests will be in weeks 4, 7 and 10 of the first semester. The deadline for the assignment will be decided after discussing with class representatives. Please note that all courseworks (3 class tests and 1 assignment) have equal weight, i.e. 25% each.

Students must gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of exam. No marks from any previous attempts will be transferred to a new resit attempt

Assesment Matrix:

Subject skills	**Assesment method**					
	Exam	**Presentation**	**Coursework**	**Projects**	**…**	**…**
L3.1.	%	%	100%	%	%	%
L3.2.	%	%	100%	%	%	%
L3.3.	%	%	100%	%	%	%
L3.4.	%	%	100%	%	%	%

Programme:

Lesson 1	***Introduction to finite element analysis and ANSYS Graphical User Interface (GUI)***
Lesson 2	***Truss elements and applications***
Lesson 3	***Solid elements and applications***
Lesson 4	***Beam elements and applications***
Lesson 5	***Plane stress, plane strain and axisymmetry concepts***
Lesson 6	***Plane elements and applications***
Lesson 7	***Plate & shell elements and applications***
Lesson 8	***Assembly process and constructing of the global stiffness matrix***

Resources:

Classroom, Blackboard, laptop, projector, audio, computer room, laboratory, security issues,....

Bibliography:

The course notes provided contain material that exceeds the course teaching and examination requirements. Students are expected to note the material covered during classes which will all be examinable material.

Erdogan Madenci & Ibrahim Guven 'The Finite Element Method and Applications in Engineering Using ANSYS',Springer, 2015 (Available online)

Further comments: