

Course Syllabus

1. Class Information

- **Class:** Innovative Ship and Offshore Plant Design
- **Class Number:** 414.462
- **Semester:** Spring 2019
- **Level of Course:** Undergraduate / Senior
- **Time:** Mon. 15:30-16:45 p.m., Wed. 15:30-16:45 p.m.
- **Location:** Room 202, Bldg. 34
- **Instructor:** Prof. Myung-II Roh
Office: Room 414, Bldg. 34
E-mail: miroh@snu.ac.kr
Phone: (02) 880-7328
Office Hours: Available before school and after school by appointment.
- **Teaching assistants:** Jin-Hyeok Kim, Joon-Bum Lee
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2. Course Topics and Description

This course presents a method for basic design of a ship and an offshore structure. Owner's requirements, determination of principal dimensions, determination of main engine and propeller, hull form design, general arrangement design, structural design, outfitting design, and so on are presented, and application examples to actual ships or offshore structures are also presented to maximize understanding of students. In addition, students perform a term project of the basic design of the actual ship or offshore structure. Through this course, the students will learn a basis for creative design method of the ship and offshore structure and a basis for design method of a creative ship and offshore structure in the future.

(1) Procedures and methods of the basic design of ship: Determination of ship's principal dimensions, Estimation of weight, Estimation of cargo hold volume, Calculation of freeboard, Prediction of resistance, speed, and power, Determination of propeller's principal dimensions, Selection of main engine, Hull form design by hull form variation method, General arrangement design, Structural design, Outfitting design

(2) Procedures and methods of the basic design of offshore structure: Overview of topsides process FEED (Front-End Engineering Design) of offshore structure, Determination of operating conditions of topsides system, Weight estimation of topsides system, Topsides layout

(3) Term project: Students have to work in a team, consisting of 4 to 5 students, on two term projects for given owner's requirements. **The 1st term project** is a **conceptual design** of a commercial ship based on the given basis ship and is obligatory for all students. After completing the conceptual design, students can then either join the **“Ship Design Contest (Free Theme)”** or continue their 1st term project and start the 2nd term project handling the **basic design** of the commercial ship. The teams who are participating in the ship design contest will be favored in their grading.

3. Term Projects Description

(1) Projects Description

① 1st Term Project

- Due date: **April, 28th (Sun), 23:00**
- Presentation of 1st term project: **April, 29th (Mon), 15:30~16:45**
- **“Initial design of a commercial ship** based on the given basis ship” including the determination of principal dimensions, performance calculation, hull form design, and general arrangement design

② 2nd Term Project

- Due date: **June, 11^t (Tue), 23:00**
- Presentation of 2nd term project: **June, 12nd (Wed), 15:30~16:45**
- **“Basic design of the commercial ship”** including the final hull form design, final general arrangement design, trim & stability calculation, and structural design (midship scantling).

or

- **“Participation of the ship design contest”** organized by the Society of Naval Architects of Korea. Teams who are participating in the ship design contest will be favored in their grading.

(2) Work Scope

① **Group A:** Students who participate in the ship design contest.

- Work Scope: **Conceptual design** of a commercial ship (1st term project)
- **Ship Design Contest**

② **Group B:** Students who do not participate in the ship design contest.

- Work Scope: All contents of the 1st and 2nd term project

4. Textbook and References

- Roh, Myung-II, Lee, Kyu-Yeul, “Computational Ship Design”, Springer, 2018

- Roh, Myung-II, “Innovative Ship and Offshore Plant Design” in English, Seoul National University, Spring 2019

5. Grade Computation

Weighted system is as follows:

- Two Exams: 40%
- Term Project: 50%
- Attendance: 10%

No attendance in any exam and no submission of any term project will result in F grade.

6. Website: <http://etl.snu.ac.kr>

Most assignments, instructions and notice for supplementary lecture will be made only on the website, so check it frequently.

7. Class Expectation

- All lectures, assignments, exams and term projects for this course are presented in English.
- Late work will be not accepted.
- Show respect to others and their property.
- Come prepared to class.
- It is required to make appointments to see instructor during office hours. Send email for an appointment at least one day in advance.

8. Exam

	Mid Exam	Final Exam
Date	April 24 th , 2019 (Wednesday), 15:30~16:45	June 10 th , 2019 (Monday), 15:30~16:45
Range of Exam	Determination of Ship's Principal Dimensions	(1) Ship Design: Hull Form Design, General Arrangement Design, Structural Design, Outfitting Design (2) Offshore Structure Design

9. Course Schedule

Week	Course Schedule			
	Monday		Wednesday	
	Date	Time: 15:30-16:45	Date	Time: 15:30-16:45
1	03/04	Introduction to Ship Design	03/06	Introduction to Offshore Structure Design
2	03/11	Owner's Requirements, Design Equations	03/13	Buoyancy and Static Equilibrium, Hydrostatic Pressure, Force and Moment on a Floating Body
3	03/18	Weight Equations, Volume Equations (1)	03/20	Weight Equations, Volume Equations (2)
4	03/25	Freeboard Calculation	03/27	Resistance and Propulsion Power Estimation (1)
5	04/01	Resistance and Propulsion Power Estimation (2)	04/03	Resistance and Propulsion Power Estimation (3)
6	04/08	Main Engine Selection (1)	04/10	Main Engine Selection (2)
7	04/15	Propeller Selection (1)	04/17	Propeller Selection (2)
8	04/22	Propeller Selection (3)	04/24	Mid Exam
9	04/29	Presentation of 1st Term Project	05/01	Hull Form Design (1)
10	05/06	Holiday	05/08	Hull Form Design (2)
11	05/13	General Arrangement Design (1)	05/15	General Arrangement Design (2)
12	05/20	Structural Design (1)	05/22	Structural Design (2)
13	05/27	Outfitting Design (1)	05/29	Outfitting Design (2)
14	06/03	Example of Ship Design	06/05	Example of Offshore Structure Design
15	06/10	Final Exam	06/12	Presentation of 2nd Term Project