NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF MECHANICAL ENGINEERING
NAVAL ENGINEERING PROGRAM

MV425 – SHIP BUILDING TECHNOLOGY II

I. GENERAL INFORMATION

CODE	**:**	MV425 Ship Building Technology II
SEMESTER	**:**	9
CREDITS	**:**	4
HOURS PER WEEK	**:**	5 (Theory–Practice)
PREREQUISITES	**:**	MV423 Ship Building Technology I
CONDITION	**:**	Compulsory
DEPARTMENT	**:**	Naval Engineering

II. COURSE DESCRIPTION

The course prepares students for analyzing and evaluating the technologies for building different types of ships considering market issues. Students understand the process of ship design and building, as well as the planning and control of operations. Ship assembling and launching are analyzed, as well as the implementation and management and shipyards

III. COURSE OUTCOMES

At the end of the course, students:

1. Understand the main concepts and principles of ship building technology.
2. Analyze methodologies for designing and building ships and oceanic structures.
3. Manage contracts, specifications and estimation of costs and budgets in ship industry.
4. Manage shipyards for different types of ship building technologies.

IV. LEARNING UNITS

1. SHIP BUILDING PANORAMA

Technology evolution / Peruvian shipbuilding industry in comparison to the world / Welding and cutting evolution in ship building / Types of vessels and their components / Naval architecture in the integration of ships systems: structure, propulsion machinery, power plant, command and communications, auxiliary and outfit.

2. SHIPBUILDING MARKETS

Markets / Supply and demand / Market composition for different types of ships / Large, medium and small markets niches / Change of the capacity measure to the CGT concept / Impact of the overcapacity of world construction / Global panorama of the ship building industry / Productivity and competitiveness / National productivity and international standards / Criteria for productivity assessment / Factors affecting productivity / National competitiveness / The curve of cost and competitiveness / Perspectives and prospects for the future of the national industry.

3. CONTRACTS, SPECIFICATIONS AND COST ESTIMATION

Contract as a legal document / Construction times / Process of contract negotiation / Contracts specification and design / Differences between contracts, specifications and designs / Vessels construction costs.

4. MODERN PRACTICE OF SHIPBUILDING AND EQUIPMENT

General layout of shipyards / Shipyards organization and components / Organizational chart / Physical organization of the shipyards.

5. SHIP CONSTRUCTION

Fundamentals of ship construction / Modern facilities / Planning and programming / Lofting and nesting / Purchase and storage of steel / Cutting and forming of parts / Manufacture and erection / Dimensional control / General outfitting / Installation of the machinery.

6. **DESIGN FOR PRODUCTION**
   Increase of production, manufacturability, maintenance and cost of assembly / Traditional vs competitive engineering. / Ship engineering and design / Ship design cycle / Information flow / Design stages: basic, functional, transition and work instructions / Design and engineering for production / General principles / Standardization / The logic of the design / CAD - CAM / Production standards / Case example: estimation of costs for manufacturing a ship structure

7. **WORK BREAKDOWN STRUCTURE**
   Construction systems / Production integrated design / Technological group / Production planning / Method of construction by area / Blocks of hull, outfitting area, area of painting. / Fabrication of pipelines parts / Lots of work / Materials logistics / Manufacture of pipelines. / Assembly of pipelines parts / Tests and painting. / Palletizing

8. **PLANNING, SCHEDULING AND CONTROL OF MATERIALS AND PRODUCTION**
   Project and production planning / Procurement / Production development and changes / Control of materials flow / Construction project.

9. **ALIGNMENT**
   Alignment of shafts and installation of main motor / Operation protocols / Protocols for alignment / Installation and alignment of driving shaft and main motor / Installation of propeller. / Installation and alignment of shafts.

10. **LAUNCHING**
    Preparatory procedure / Launching elements and devices / Critical time / Description of launching periods / Pivot / Advantages of stern launching / Lateral launching.

V. PRACTICAL EXPERIENCE

Practice 1: Group project assignment.
Practice 2: Planning and scheduling
Practice 3: Design. Revision 1
Practice 4: Design. Revision 2
Practice 5: Design. Revision 3
Practice 6: Project presentation and defense

VI. METHODOLOGY

The course takes place in theory and practice sessions. In theory sessions, faculty presents the concepts, principles and methods. In practice sessions, students analyze and solve diverse problems related to ship building technologies, and complete a design project. At the end of the course, students present and defend a final report. Student active participation is promoted throughout the course.

VII. GRADING FORMULA

The Final Grade PF is calculated as follow:

PF = (EP + EF + 2*PP) / 4

EP: Mid-term Exam EF: Final Exam
PP: Average of Practical Works

VIII. BIBLIOGRAPHY

1. TAGGART
   Ship Design and Construction, 2008.
2. RICHARD STORCH
   Ship Production, 2010.
3. J. ANTHONY HIND
   Ship Design and Shipbuilding Production, 2005.