Navis Consult
a KONGSBERG company

TEME ZA DIPLOMSKE RADOVE S FIRMOM NAVIS CONSULT

NO.	NAVIS DISCIPLINE	GRADUATE THESIS	ACADEMIC SUPERVISOR RITEH
1	Structure	**Midship section design for small ROPAX vessel** - Midship section drawing - Scantling calculating according to class rules - RO-RO deck grillage calculation, using FEM beam elements tool (DNV 3D-Beam). - Side structure calculation, using FEM beam elements tool (racking check included). - Bottom strength calculation for docking condition, using FEM beam elements tool. - Superstructure primary structure calculation, using FEM beam elements tool (including pillar arrangement). - Verification of global bending stress distribution in parallel mid-body – check of superstructure contribution to global bending, using FEM plate elements tool (DNV Genie).	dr. sc. Davor Bolf dbolf@riteh.uniri.hr; prof. Albert Zamarin albert.zamarin@riteh.uniri.hr
2	Structure	**Foundation design for offshore crane** - Typical hull section IWO offshore crane foundation - Crane foundation drawings including structural details and welding information. - Selection of the crane with predefined loads at the crane-pedestal interface. - Elaboration of the rules governing the applicable offshore crane loads. - Analyses of the Crane foundation, using FEM plate and beam elements tool (DNV Genie). - Buckling check (code check) of the plated and beam elements IWO Crane foundation using FEM tool (DNV Genie).	dr. sc. Davor Bolf dbolf@riteh.uniri.hr; prof. Albert Zamarin albert.zamarin@riteh.uniri.hr
3	Structure	**Foreship structure design for polar class passenger vessel** - Hull Ice region plan - Foreship area drawing up to first deck above Upper ice waterline (decks, transverse and longitudinal sections, shell expansion) - Scantling calculating according to class rules. - Ice load patches calculation & load application plan for the following FEM analysis's purpose. - Strength assessment of the plated structure, using FEM tool. - Buckling check (code check) of the plated and beam element, using FEM tool.	dr. sc. Davor Bolf dbolf@riteh.uniri.hr; prof. Albert Zamarin albert.zamarin@riteh.uniri.hr
4	Interior & Safety	**Provision rooms:** -Calculation of number, size and type of rooms -Logistics for food handling	
5	Interior & Safety	**Galley design:** - Calculation of size - What type of equipment and size needed based to number of people onboard and duration (International crew etc) - Different type of equipment based on culture - Logistic to avoid mixing and dirty tools - Garbage handling also to avoid mixing clean and dirty	
6	Interior & Safety	**Garbage room design:** - How to handle and store increased amount of garbage - New ways to handle - Size of store-rooms based to number of people onboard and duration etc	
7	Interior & Safety	**Fresh Water requirements on the ship:** - What is amount of water sufficient for passenger, yacht and offshore ship? - Explore new type of people onboard o Different culture o More often women among the seafarers o Different type of seafarers (Technicians, divers etc)	
8	Machinery Systems	**Ship exhaust analysis** - Exhaust Backpressure calcs. This student job will be extended by the influence of exhaust backpressure on the engine casing 3D model. - Comparison of different SCR systems (60% urea, 40% urea and dry urea).	
	Machinery Systems	**Ship systems: cooling/heating, ballast, sewage** - Cooling / Heating systems - Pressure drop based on 2D/3D models (concept/final?) > Flow calc / Dimensioning - Comparation of different Ballast systems (investigate Manual creation as part of topic / partial work?) - Comparation of different Sewage treatment systems	prof. Stefan Ivić stefan.ivic@riteh.uniri.hr i prof. Siniša Družeta sinisa.druzeta@riteh.uniri.hr
10	Deck Machinery	**Side doors** 1. Basic design 2. Interface (prikazuje spajanje shell inserta sa brodom) 3. Structura vrata (FEM) 4. Shell Insert (FEM) 5. Assembly (Hinge, Strong back, Hydraulic Cyl. ..., za sve se moze napravit racun koji promjer sarnira, odabir cylindra, itd ...) 6. Cleating (proracun, sklopni, ...) 7. Nacrti (basic, interface i sklopni, ...)	
11	Deck Machinery	**Ramp design** 1. Basic design 2. Interface (prikazuje potrebna pojacanja na trupu) 3. Structure rampi (FEM + proracun glavnog presjeka rampe) 4. Link mehanizam izmedju sekcija rampi (proracun, sklopni, ...) 5. Assembly (Hinge, Supporti, Hydraulic Cyl., Stoperi, ..., za sve se moze napravit racun koji promjer sarnira, odabir cylindra, itd ...) 6. Cleating (proracun, sklopni, ...) 7. Nacrti (basic, interface i sklopni, ...)	prof. Albert Zamarin albert.zamarin@riteh.uniri.hr
12	Deck Machinery	**Davit design** 1. Basic design 2. Interface (deck loads) 3. Structure (FEM) 4. Link mehanizam izmedju sekcija rampi (proracun, sklopni, ...) 5. Assembly (Hinge, Supporti, Hydraulic Cyl., Stoperi, ..., za sve se moze napravit racun koji promjer sarnira, odabir cylindra, itd ...) 6. Nacrti (basic, interface i sklopni, ...)	prof. Stefan Ivić stefan.ivic@riteh.uniri.hr i prof. Siniša Družeta sinisa.druzeta@riteh.uniri.hr;

NO.	NAVIS DISCIPLINE	GRADUATE THESIS	ACADEMIC SUPERVISOR RITEH
13	Deck Machinery	**Bow door design** 1. Cleating basic design (zanimljiv je zbog specificnog kretanja ruke) 2. Cleating structure (FEM) 3. Assembly (Hinges, ..., za sve se moze napravit racun koji promjer sarnira, ...) 4. Nacrti (basic,i sklopni, ...)	
14	Deck Machinery	**Structural Assessment of Winch Components Using FEA** Focus: Analyze stresses and deformation in the winch drum, base, and gear housing under marine load conditions, including rope tension, braking torque, etc.	prof. Robert Basan robert.basan@riteh.uniri.hr
15	Deck Machinery	**Static and Buckling Analysis of a Marine Crane components Using Finite Element Methods** Focus: Evaluate the boom under lifting, tilting, and wind loads per DNV-ST-0378. Include linear buckling and structural optimization for weight reduction.	prof. Domagoj Lanc domagoj.lanc@riteh.uniri.hr; prof. Stefan Ivić stefan.ivic@riteh.uniri.hr i prof. Siniša Družeta sinisa.druzeta@riteh.uniri.hr; prof. Robert Basan robert.basan@riteh.uniri.hr;
16	Deck Machinery	**Structural Design and Fatigue Verification of a Subsea Lifting Frame** Focus: Perform fatigue life prediction under cyclic offshore lifting operations using FEA. Verify lifting lugs and welds based on DNV fatigue guidelines.	prof. Robert Basan robert.basan@riteh.uniri.hr
17	Energy Systems	**Ship's energy system calculations** It is necessary to develop a simulation model of the ship's energy system: - Load flow calculation - Short-circuit calculation - Harmonic distortion calculation - Dynamic (transient) characteristics and stability calculation - Implementation of protective relays (current, voltage, frequency): - Relay coordination and selectivity - Preparation of a protection parameter table - Verification of data accuracy through TCC graphs All simulations and calculations must be carried out in accordance with IEC and IEEE standards, and the results must comply with the limits prescribed by the classification society (Lloyd's Register, DNV, ABS, BV). The modeling and simulations must be performed using the ETAP software tool.	dr. sc. Zoran Šverko zoran.sverko@riteh.uniri.hr; doc. dr. sc. Vladimir Valentić vladimir.valentic@riteh.uniri.hr; prof. Rene Prenc rene.prenc@riteh.uniri.hr
18	Control & Digital	**Controlling an ABB Drive via PROFIdrive v4.2 in TIA Portal** - Understand main vs. local control schemes - Configure control logic and HMI in TIA Portal - Learn how PROFIdrive enables control and feedback - Interpret and apply Control Word / Status Word bits - Observe transitions through the drive's state machine	
19	Control & Digital	**Building Python simulation and Siemens PLC/HMI control for anchor hydraulic windlass hoisting and lowering process** Build PLC control and monitoring for anchor lowering and hoisting taking in consideration process variables and physical environment. Anchor handling is done via hydraulic windlass as actuator, and hydraulic unit as a source of power oil. Simulation of the process will be done using Python script and connection to PLC can be obtained using Snap7 python library suite which is open source.	
20	Electrical	**Analysis of Power Grid Requirements for Charging Batteries for Electric Ferries on Coastal Routes: A Case Study of the Croatian Coast** - Investigate the technical specifications of battery-electric ferries (battery capacity, energy consumption, charging time) - Determine energy requirements for charging on selected coastal routes - Calculate the load impact on the onshore power grid in port areas - Propose a technical solution for charging infrastructure (fast charging, smart charging, solar support, etc.).	Vladimir Valentić vladimir.valentic@riteh.uniri.hr;
21	Ship Hydrodynamics	**Comparison of propulsive efficiency of ducted and U ducted propeller by means of CFD simulations** Next simulations should be done for comparison: -Open-water test for dutcted and U ducted propeller -Self propulsion with use of Virtual disc (induced velocity correction in OW test)	
22	Ship Design	**Feasibility study of building USV from conventional materials in shipbuilding sector** -Analyse current prices of material and build for steel, aluminium and GRP -Perform simplified hull scantlings calculation in three materials -Calculate final hull weight for each type of material -Explore possible ways of recycling materials in this study -Compare all three materials in: *Weight *Material price and availability *Building price per vessel unit *Recyclability -Draw a conclusion of which material should be used for large fleet of USV from financial and environmental point of view	prof. Albert Zamarin albert.zamarin@riteh.uniri.hr
23	Machinery	**Shaft line design** - Preliminary calculation - Scantling calculating according to class rules - Alignment calculation	