ENGLISH MEDIUM INSTRUCTION (EMI) AND MARITIME ENGLISH COURSE: HIGHER EDUCATION INTERNATIONALIZATION IN INDONESIA

Dr. Nurmala Elmin Simbolon
Politeknik Negeri Pontianak (Indonesia)

Abstract. The popularity of English medium instruction (EMI) practice in Indonesia has experienced a substantial increase in recent years. This surge can be attributed to the growing emphasis on the internationalization of higher education, with the maritime education sector also actively embracing this trend, aligning itself with the broader movement. Therefore, this research examined the implications of implementing EMI in teaching and learning practices, and determined its impact on curriculum arrangements in higher education. Data were collected through interviews with key stakeholders, observation of a recorded online EMI classroom, and program curriculum. The collected data were analyzed using thematic content analysis. The results showed that there is a redefined role for Maritime English lecturers and a need for revision of the curriculum in English courses within Maritime-related programs. Furthermore, adopting an English for Academic Purposes (EAP) approach is deemed crucial in addressing the immediate learning needs of students. These findings underscored the crucial role played by Maritime English lecturers in supporting students' learning in an EMI environment.

Keywords: EMI; maritime english; EAP; higher education internationalization

1. Introduction

The internationalization of higher education has led to increased English medium instruction (EMI) practices implementation globally (Wachter & Maiworm 2014; Galloway, Kriukow, & Numajiri 2017). This phenomenon is not limited to other countries but also includes Indonesia, as evident in recent research (Lamb, Waskita, Kuchah, Hadisantosa, & Ahmad 2021). The Indonesian Ministry of Education and Culture (MoEC) has played a significant role in promoting the adoption of EMI in higher education through its current arrangement. The MoEC Decree Number 3/M/2021 sets key performance indicators for Indonesian higher education institutions, aligning with the internationalization agenda. These indicators include fostering collaborations between universities and their overseas institutional

partners. Several indicators include the collaboration established by universities with their institutional partners overseas in faculty member exchange and the adoption of curriculum from their international partners, which the Indonesian MoEC recognizes. Most institutions stated in the Decree are based in English-speaking countries, such as the USA, the UK, and Australia.

Maritime education sector is actively embracing the use of EMI practice, reflecting the reliance of the industry on English as a common working language. English is widely utilized in various maritime sectors, including ship safeguarding, crew management, and the environment. The International Maritime Organization (IMO) recognizes the significance of English proficiency and provides guidelines, such as the Standard Communication and Maritime Phrases (SMCP) document. To cater to the specific communication needs of the Maritime field, model courses such as IMC 3.17 have been developed, focusing on communication within the Maritime domain. These initiatives highlight the indispensability of English skills in the Maritime sector.

Indonesia, being an archipelagic country, has a significant number of maritime education institutions. These institutions offer various Maritime-related programs overseen by three ministries, namely the MoEC, the Ministry of (Sea) Transportation, and the Ministry of Maritime and Fisheries. Presently, there has been no research on the practice of EMI practice within the context of higher education internationalization in the Maritime education sector in Indonesia. However, the growing trend of EMI implementation in this sector is inevitable, specifically considering the current policies of the Indonesian MoEC regarding the internationalization of higher education. This research focuses on a specific program, the Shipping System program, to shed light on the current challenges associated with adopting EMI within the Maritime education field at a university in Indonesia.

2. Literature Review

EMI refers to using English as the medium for teaching content or discipline subjects in an environment where English is not commonly spoken (Dearden, 2015). This definition is applicable to the context of Indonesia. There is a close relationship between EMI and English for Academic Purposes (EAP). For instance, content lecturers typically engage in EMI practice, while English specialists focus on teaching EAP. In line with the definition by Dearden (2015), it is important to note that EMI lecturers in Indonesia and in similar contexts do not necessarily possess a foreign language teaching education background.

Several studies have been conducted globally, including in Indonesia, focusing on EMI. These studies highlighted the internationalization of institutions as one of the driving factors behind the adoption of EMI (Hu 2019; Lamb et al. 2021). It is widely believed that EMI can enhance the English proficiency of both students and lecturers (Aquilar 2017; Talaue & Kim 2020). Furthermore, research explored the perspectives of key stakeholders in EMI implementation. For instance, Tseng

et al. (2020) conducted a mixed-methods research examining the perception of students and satisfaction levels regarding EMI in shipping courses in Taiwanese higher education, as well as those of content experts. The research was carried out with data collected through questionnaires and interviews. The findings indicated that certain aspects, such as course learning objectives and students' English proficiency, were deemed highly important but showed low satisfaction levels. Conversely, items such as electronic teaching platforms and the relevance of the subject to practical applications were considered low in importance but scored high in satisfaction. From the research findings, several key issues emerged. One important consideration for ensuring the quality of learning in EMI is allocating adequate time for teaching preparation. The research by Tseng et al. (2020) stated that an increase in salary needed to correspond to the effort and time dedicated to preparing EMI courses. Additionally, it is crucial to adequately prepare EMI students with sufficient English proficiency to enhance their learning experiences.

Wilang (2022) conducted research in Thailand focusing on the anxiety experienced by EMI students and their coping strategies. By analyzing students' journals and interviews, specific areas where students commonly felt anxious were identified. These areas included the fear of making mistakes, concerns about receiving negative evaluations from lecturers and peers, and a lack of confidence during communication. Students employed coping strategies to address these anxieties, such as improving their preparation for class and seeking assistance from lecturers and classmates. These strategies played a crucial role in helping them overcome anxiety, thereby enhancing their learning experiences.

Hu and Li (Hu and Li 2017) conducted research that focused on the use of EMI by ten professors in two universities in China. The research revealed that the lecturers primarily utilized simple questions and did not incorporate higher-order thinking categories such as evaluation and analysis. Lecturers were found to use simple questions. Therefore, students with limited English proficiency often provided short answers and relied heavily on their first language (L1). These findings underscored the need for improvement in EMI classroom discourse to effectively support students' learning in both language and content domains. A significant factor influencing the discourse was the limited English proficiency, which impacted the ability of lecturers to pose more extensive questions for students to provide elaborate responses.

Preliminary studies established a strong connection between English for Specific Purposes (ESP) and EMI concerning EMI implementation. The collaboration between ESP and EMI specialists is crucial for successfully implementing an EMI program. In addressing this issue, Costa and Mastellotto (2022) conducted research to explore the potential of ESP in supporting EMI students in developing communication and academic disciplinary skills through syllabus design. The findings indicated a coordinated effort between ESP and EMI specialists during

collaboration. ESP lecturers designed the course content to meet the specific knowledge and skills required by students, as identified by the content-focused EMI specialists. Students' survey responses revealed an improvement in their learning experience, with several areas where ESP proved beneficial in the EMI environment, such as engaging in discussions and writing reports. This approach can potentially address challenges faced by students in the EMI environment, as identified in various contexts (Wilang, 2022), including the context of this research.

Focusing on English lecturers, Murphy Odo (2023) conducted a study using a quasi-experimental design in an undergraduate program at a public university in South Korea. Participants of pre-service English lecturers were in two classes, one using an online course and the other in an offline mode. One significant finding of the research was that the participants in the online class performed better on the content knowledge test than those in the offline. This result was attributed to the online class participants having more frequent access to learning resources. However, no significant difference in content-related writing performance was found between the offline and online students. This finding suggested that writing in a second language presented challenges that are not solely related to incorporating technology. The studies by Costa and Mastellotto (2022) and Murphy Odo (2023) provided evidence that ESP lecturers have the potential to support both students and lecturers in EMI program. Murphy Odo (2023) stated that English lecturers often find writing, which is a productive skill, challenging regardless of the learning mode. Meanwhile, EMI students, particularly those with limited English proficiency, tend to face additional challenges when transitioning to an EMI environment.

Recent studies conducted by Lamb and colleagues (Lamb et al. 2021) and Simbolon (2021a) highlighted the limitations faced by organizations regarding EMI implementation in Indonesia, which comprises degree and non-degree programs. Degree programs often bear labels such as International Undergraduate programs (IUP) (Lamb et al. 2021), international classes, and bilingual classes (Simbolon 2021a). However, these studies have not specifically focused on the field of Maritime. The research question is "How is EMI course implementation in the Shipping System program in terms of:
1. Course curriculum
2. EMI lecture practice
3. English (Maritime English) lecturers' practice
4. EMI students' learning experience?"

3. Methods

In this research, a qualitative case study approach based on Yin's framework (2009) was employed to examine the current practice of EMI in Maritime education sector in Indonesia. The dataset consisted of interview transcripts, notes, a recorded online EMI classroom session, and EMI program curriculum. Due to

the COVID-19 pandemic, all data collection was conducted online. This research started with an initial communication with EMI program coordinator, where the purpose was introduced. Furthermore, an interview with Maritime English course was conducted using English through Zoom. Although the interview was not recorded, detailed notes were taken. The interview focused on two main questions: the specific course lecturers teach and the methods and reasons behind their teaching practices. Additionally, a student who had recently completed the final project in the EMI course was interviewed in Indonesian through a voice call on a social media platform. The key areas of inquiry included the student's background information, experience in the EMI course, and the challenges. Furthermore, access was granted to watch a recording of a classroom teaching session in the EMI course, contributing to the data collection process.

Content analysis was used for data analysis to answer the research questions. The translation of the interview data and its presentation were in a non-verbatim manner.

Research context

The Shipping System program is part of a range of programs at an A-level university in Indonesia that provide EMI options. As stated earlier, the university's key performance indicators determine its ranking, with A level being the highest category.

4. Findings and Discussions

The findings indicate that EMI implementation has various impacts on program organization, specifically regarding the approach to English course within EMI program.

EMI program curriculum

EMI program is a four-year bachelor's Degree program. Table 1 presents the information about the course, while Appendix 1 provides a detailed list of courses offered.

Table 1. EMI Course information

Items	Information
EMI Program Name	Shipping System
Form	Double Degree
Level (number of credits)	Bachelor's Degree (144 credits*)
Adopted Certification	Zeva – an agency in system accreditation, evaluation and certification In Germany (Zeva, 2022)
Number of credits of English course	six

*One credit bears approximately 40 hours of learning/semester

As shown in Table 1, EMI program at the faculty in the context of the research offers a double degree program. It is important to highlight that students have the opportunity to spend their final semester at a partner institution in Germany. Upon completion, students can receive two degrees, one from their home institution and the other from the university partner. Additionally, over 80% of courses are EMI content courses and English language course accounts for six credits, which is less than 1% of the total credits.

The findings suggest that students in EMI program are exposed to extensive English usage, as all lecturers conduct their classes in English. Despite being a better opportunity for students to practice English, it potentially creates difficulties and anxiety (Wilang 2022). This assumption can be further validated by examining the perspectives of students participating in this research.

EMI online classroom

Based on the online classroom data, it is evident that lecturers have a limited understanding of effective EMI implementation. A summary of this observation is shown in Table 2.

Table 2. Classroom observation summary

Items	Information
Course Name	Maritime Safety and Environmental Management
Duration	60 minutes
Mode	Online using Zoom meeting
Students	All domestic students
Teaching type	Lecturing
Language Use	Exclusively full English
Strategies	Using interactive slides in PowerPoint and color code with the text

According to Table 2, EMI lecturers in the online class exclusively used English for the entire session duration, and students were allowed to ask questions at minute '57. This particular practice contrasts with those in the research by Hu and Li (2017). It can be reasoned that the online EMI teaching in this research was a result of the COVID-19 restrictions. When lecturers were asked about their feelings regarding EMI practice, they stated a famous phrase used in the Indonesian language, "*mati gaya*" or "frozen". They further explained that they used the Indonesian language for ice-breaking in offline classes. These observations suggest that EMI lecturers highly value the use of full English in the classroom.

On the other hand, lecturers have a limited understanding of the functional use of L1 (Lin 2015) in EMI classrooms. This finding highlights a few important points. Firstly, considering that approximately 80% of the courses in EMI program are taught in English when all EMI lecturers adopt a similar approach to those in

this article, it could lead to exponential challenges for students. Additionally, this finding emphasized the need for continuous professional development to improve the effectiveness of teaching EMI courses and support students in their learning experience. Along with the area of the co-designed syllabus (Costa & Mastellotto 2022), a topic of L1 use should be listed in the training program for EMI lecturers.

Maritime English lecturers

Several studies, such as Galloway et al. (2017) and Simbolon (2021a), highlighted the importance of collaboration between EMI and EAP specialists. Additionally, the role of English lecturers has been identified as crucial, as discussed by Costa and Mastellotto (2022) and Murphy Odo (2023). Notably, Maritime English lecturers in EMI program implements certain key practices. The findings related to these practices are summarized in Table 3. Specifically, lecturers utilize EAP with a focus on Maritime content to facilitate English learning for students.

Table 3. Maritime English lecturers' teaching practice

What to teach	Maritime English
How to teach and why?	– Starts with vocabulary and grammar using content materials – The EAP approach uses note-taking skills from listening and reading comprehension by presenting ideas from the reading text – Listening strategies in stages

The interview data showed that Maritime English lecturers incorporated General Maritime English (GME) (Zhang & Cole 2018) into the IMC 3.17 course provided by the IMO. Lecturers started by focusing on vocabulary and grammar components during their teaching. They predominantly utilized Maritime-related content to enhance the learning experience. It is worth mentioning that a Maritime English lecturer, who is also an EMI practitioner (Appendix 1), possesses knowledge of various approaches to second language teaching. In terms of teaching listening skills, lecturers outlined a specific strategy involving multiple stages of learning activities. First, students would listen to grasp a general idea. Subsequently, they listen again to verify sentence-by-sentence comprehension. Finally, the audio is turned off, allowing students to practice listening independently.

Another significant aspect is that the English course is offered across three semesters. This becomes particularly crucial since there is no English Proficiency Test (EPT) level requirement for students applying to EMI program. Each semester consists of approximately 40 to 80 hours of classroom meetings. Meanwhile, the IMC 3.17 course, aimed at attaining an intermediate level of English proficiency, necessitates around 600 hours of classroom meetings. A thorough review of the current curriculum is crucial in order to implement EMI effectively.

EMI students

Overall, students' learning experience showed a sense of satisfaction despite the challenges faced during the early semesters of their study.

Table 4. Students' perspective on EMI program

Items	Information
Year	Final/Fourth
English Proficiency Test (EPT) Before EMI program	No record
English Proficiency Test (EPT) after EMI program	Upper-Intermediate (B2 CEFR)
Experience	– Lecturers' use of English – Lecturers use L1 when examining their final project report – Lecturers use L1 when they joke – Students are given freedom to use L1 when they cannot use full English – Students' use of English in presentation and thesis writing
Challenges	– Content Vocabulary – Listening to lecturers – Performing Presentation
Benefits	– A medium to use English – Confidence in using English

Table 4 shows several important findings. Firstly, there is no recorded data on the English proficiency levels of students at the beginning of the EMI course. Therefore, the validity of their reported proficiency at the end of the program as an indicator of EMI program's impact on their English skills is questionable. This limitation becomes evident when examining the self-reported benefits of EMI program in terms of English proficiency. For instance, the student stated, "This international class (EMI) helps me to get used to communicating in English and become brave, specifically to speak with a foreign lecturer". While this statement highlights a perceived benefit, it lacks specific indicators or objective measures. It is important to note that the challenges faced by students, such as difficulties with content vocabulary, listening comprehension, and public speaking, indicated their limitation in English proficiency during the start of the program. However, without specific information on the student's initial EPT scores before starting the program, it is not possible to speculate on the extent of their improvement in English proficiency.

Another important point from the interview with the student is that the L1 was used in several ways, such as writing the final report without using English. Interestingly, while the Indonesian EMI lecturer used L1 in telling jokes, the foreign one (read Maritime English lecturer) found this engagement strategy challenging.

More interestingly, when students were asked about Maritime English lecturers' use of full English, their responses were positive: "His delivery in full English .. his pronunciation is clear. He explained the lesson. In a simple way, ...by giving examples, using pictures, and body language." A probing question was given to ask further details of English, adopting General English, or GE approach.

> Interviewer: Was the GE class helpful for your presentation
> Student: so-so

It is important to note that the translation use of "so-so" from the original Indonesian mostly refers to a softening meaning of insufficiency or low quality.

In terms of students' English use, it is important to note that no language support was provided during the recorded EMI lecturers' practice. As a result, this setting was not conducive, particularly in preparing students to write their thesis in English. Despite the challenges faced in understanding the lessons during the first year of study, students stated that the EMI environment has helped improve their confidence in English communication and learning the subject over time.

The findings from the research highlight some key points. Firstly, it is necessary to review the current curriculum to assess the inclusion of English course in EMI program. This review should consider the number of credits allocated to these courses and the teaching approach employed by EAP lecturers. Additionally, the findings emphasize the importance of providing professional development support to EAP lecturers, particularly in supporting EMI students learning. In the context of Maritime English lecturers in Indonesia, whose focus is primarily on occupational communication purposes, these findings underscore the urgent need to incorporate EAP practices (Simbolon 2021b). There is a potential need to review the current curriculum by including additional credits for an English course and implementing an EPT requirement for students entering an EMI program.

5. Conclusions and Summary

In conclusion, this research specifically focuses on the implementation of English medium instruction (EMI) in Maritime Education institutions. A case study approach was employed, utilizing interviews with students and a Maritime English lecturer, observation of recorded online EMI content classroom teaching, and analysis of EMI program curriculum. The findings show some key issues. One significant issue identified was the absence of an EPT requirement for students entering EMI program. This means that students are not required to provide an EPT score to indicate their English proficiency. To address this, the university has initiated collaboration and implemented a certification system to facilitate a smoother integration between Maritime education institution and EMI program. This research also highlighted the challenges faced by students and lecturers,

consistent with findings from similar global studies. The further findings emphasized the need to redefine the role of Maritime English lecturers. Traditionally, their role focused on supporting occupational communication within the maritime field, but presently, it encompasses the preparation of students for the immediate demands of EMI classrooms. They also served as EAP specialists equipped to address the specific language needs of students in the EMI context.

While this research is limited to a single faculty within one university and involves only one student and a Maritime English lecturer, its findings still hold the potential for transferability to similar contexts, locally and globally. This is because EMI is a prevailing trend that aligns with the objectives of internationalizing higher education. Moreover, the Maritime education sector, closely intertwined with the use of English as its working language, further emphasizes the significance of the study. Future research examines the classroom discourse of Maritime English lecturers who adopt EAP strategies is needed to enhance the understanding of effective EMI practice and their impact on students' learning outcomes.

NOTES

1. Program Sarjana (S1) Double Degree. 2022. Program. Departemen Teknik Sistem Perkapalan Gedung WA. Available from: https://www.its.ac.id/siskal/id/program-studi/program-sarjana-s1-double-degree/#1540804273287-6d4d77f9-629b. [viewed on 1 October 2022].

REFERENCES

AGUILAR, M., 2017. Engineering lecturers' views on CLIL and EMI. *International Journal of Bilingual Education and Bilingualism*, vol. 20, no. 6, pp. 722 – 735. Available from: https://doi.org/10.1080/13670050.2015.1073664.

COSTA, F. & MASTELLOTTO, L., 2022. The Role of English for Specific Purposes (ESP) in Supporting the Linguistic Dimension in English-medium Instruction (EMI). *CLIL Journal of Innovation and Research in Plurilingual and Pluricultural Education,* vol. 5, no. 2, pp. 37 – 52. Available from: https://doi.org/10.5565/ rev/clil.91.

DEARDEN, J. 2015. *English as a medium of instruction – A growing global phenomenon.* Oxford: University of Oxford. Available from: https://ora.ox.ac.uk/objects/uuid:4f72cdf8-b2eb-4d41-a785-4a283bf6caaa.

GALLOWAY, N.; KRIUKOW, J. & NUMAJIRI, T., 2017. *Internationalisation. higher education and the growing demand for English: an investigation into the English medium of instruction (EMI) movement in China and Japan*. The British Council.

HU, G., 2019. English-medium instruction in higher education: Lessons from China. *The Journal of Asia TEFL*, vol. 16, no. 1, pp. 1 – 11. Available from: https://doi.org/10.18823/asiatefl.2019.16.1.1.1.

HU, G., & LI, X., 2017. Asking and answering questions in English-medium instruction classrooms: What is the cognitive and syntactic complexity level? In: J. ZHAO & L. Q. DIXON (eds.). *English-medium instruction in Chinese universities: Perspectives, discourse and evaluation,* pp. 184 – 203. New York: Routledge.

LAMB, M.; WASKITA, D.; KUCHAH, K.; HADISANTOSA, N. & AHMAD, N., F., 2021. *The state of English as a medium of instruction (EMI) in higher education institutions in Indonesia*. Web site. Available from: https://www.britishcouncil.id/sites/default/files/the_state_of_english_as_medium_of_instruction_in _heis_in_indonesia_full_report_final.pdf.

LIN, A.; M., Y., 2015. Conceptualizing the potential role of L1 in CLIL. *Language, Culture and Curriculum*, vol. 28, no. 1, pp. 74 – 89. Available from: https://doi.org/10.1080/07908318.2014.1000926.

MURPHY ODO, D., 2023. A comparison of online and offline versions of an English as a medium of instruction course. *Studies in Foreign Language Education*, vol. 37, no. 1, pp. 1 – 20.

SIMBOLON, N. E., 2021a. English Medium Instruction (EMI) practice: Higher education internationalization in Indonesia. *Englisia: Journal of Language, Education, and Humanities, vol.* 8, no. 2, pp. 72 – 83. Available from: https://doi.org/10.22373/ej.v8i2.8961.

SIMBOLON, N. E., 2021b. Needs analysis of English for Specific Purposes (ESP) courses in vocational higher education. In: PAZAVER, A., MANUEL, M. E., BOLMSTEN, J., KITADA, M. & BARTUSEVICIENE, I. (eds.). *Proceedings of the International Maritime Lecturers' Association. Seas of transition: Setting a course for the future,* pp. 149 – 161. World Maritime University. Available from: http://dx.doi.org/10.21677/imla2021.16.

TALAUE, F.G., & KIM, M.K., 2020. Investigating the Advantages of English Medium Instruction (EMI) in the Indonesian Workplace. *LEARN Journal: Language Education and Acquisition Research Network Journal*, vol. 13, no. 2, pp. 321 – 324.

TSENG, P-H.; PILCHER, N. & RICHARDS, K., 2020. Measuring the effectiveness of English Medium Instruction Shipping courses. *Maritime Business Review*, vol. 5, no. 4, pp. 351 – 371. Available from: https://doi.org/10.1108/MABR-10-2019-0042

WACHTER, B. & MAIWORM, F., 2014. *English-Taught Programmes in European Higher Education: the State of Play in 2014*. Bonn: Lemmens.

WILANG, J. D., 2022. Specific Anxiety Situations and Coping Strategies in Full English Medium Instruction Engineering Programs. *International Journal of Engineering Pedagogy (iJEP)*, vol. *12, no.* 6, pp. 70 – 84. Available from: https://doi.org/10.3991/ijep.v12i6.33453.

YIN, R. K., 2009. *Case study research: Design and methods* (4th Ed.). Thousand Oaks, CA: Sage.

ZHANG, Y., & COLE, C. 2018. Maritime English as a code-tailored ESP: Genre-based curriculum development as a way out. *Iberica*, no. 35, pp. 145 – 170.

ZEVA, 2022. ZEvA. Web site. *ZEvA.* Available from: https://www.zeva.org/en/ [viewed on 5 October 2022].

Appendix 1
Shipping System Course Curriculum

No	Course Name	Credits
	Semester 1	
1	Mathematics I	3
2	Physics I	4
3	Chemistry	3
4	Introduction to Maritime Technology	2
5	Pancasila	2
6	Drawing Techniques and CAD	2
7	English	2
	Semester 2	
1	Mathematics II	3
2	Physics II	3
3	Indonesian Language	2
4	Citizenship	2
5	Religion	2
6	Material Engineering & Metal Processing	3
7	Introduction to Naval Architecture/Ship Building Theory	3
	Semester 3	
1	Thermodynamics	3
2	Fluid Mechanics	2
3	Ship Electronics	3
4	Ship Construction & Strength/Ship Construction	2
5	Engineering Mechanics	2
6	Maritime English I	2

7	Measurement & Control Technology	3
	Semester 4	
1	Maritime English II	2
2	Combustion Engines and Turbine	3
3	Ship Resistance and Propulsion	3
4	Heat Transfer	3
5	System Transmission	2
6	Deck Machinery & Cargo Handling Systems	2
7	Electrical Engines & Power Electronics	3
	Semester 5	
1	Knowledge and Technology Application	3
2	Maritime Safety & Environmental Technology	2
3	Numerical Analysis and Computer Programming	2
4	Fluid Machinery	2
5	Operating Media & Dangerous Materials	3
6	Automation Technology	3
7	Machinery Basic Design	3
	Semester 6	
1	Technopreneur	2
2	Ship Diesel Engines & Plants	3
3	HVAC (Heating, Ventilation, Air Conditioning)	3
4	Ship Electrical Installations	3
5	Technical Ship Operation	3
6	Desain III: Rencana Umum, Fire & Safety Plan	2
7	Elective Course 1	3
	Semester 7	
1	Ship Maintenance	5
2	Ship Automation	3
3	Machinery Dynamics	3
4	Ship Machinery Plants/Engine Room Layout	4
5	Complex Ship Operation	3
6	Elective Course 2	2
	Semester 8	
1	Maritime Surveying	3
2	Maritime Safety & Environmental Management	2
3	Elective Course 3	2
4	Maritime Economics	2
5	Internship	2
6	Bachelor Thesis & Colloquium	5
	Total	144

Electives

No.	Course Name	Credits
1	Ship Performance & Energy Efficiency	2
2	Condition Monitoring & Condition-Based Maintenance	2
3	Damage Analysis & Trouble Shooting	2
4	Maritime Law	2
5	LNG Technology	2
6	Risk Management	2
7	Flag states' relations with Industry and Class	2
8	Future and Change in International Legislation	2
9	ILO Convention	2
10	Introduction to Ship Automation	3

✉ **Dr. Nurmala Elmin Simbolon**
ORCID iD: 0000-0003-3733-1324
Web of Science Researcher ID: AAC-1554-2019
Politeknik Negeri Pontianak
Kalimantan Barat, Indonesia
E-mail: simbolon73@gmail.com